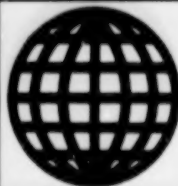


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AVIATION AND COSMONAUTICS

No 9, September 1988

Better Training of Military Student Pilots Urged
91440095a Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 9, Sep 88 (signed to press
5 Aug 88) pp 1-3

[Article by Col Gen Avn A. Goryainov, deputy commander in chief of the Air Forces for military educational institutions: "Improving Training in the Spirit of Perestroyka"]

[Text] It was noted in the keynote address at the 19th All-Union Party Conference that today it is no longer sufficient merely to correct all mistakes and errors of omission in scientific policy. What is required is a profound restructuring, abandonment of many persisting structures in the mechanism of economic management, as well as improvement of internal relations in science. It is essential to create a qualitatively new Soviet scientific potential, without which it is impossible to achieve breakthroughs in basic research in a short period of time and on this basis successfully to implement the entire aggregate of targeted programs for socioeconomic reorganization of our society.

I believe that these words also apply in full measure to Air Forces military educational institutions. If we analyze the proceedings of the 19th All-Union Party Conference not in a general way but through the prism of the tasks facing Air Forces military educational institutions, as it were, one reaches the following conclusion: success and development of perestroyka in military aviation will depend in large measure on what ideological-moral and professional level will distinguish our graduates. If we fail to develop in our students such qualities as creative activeness, a sense of the new and progressive, a self-critical attitude, integrity, the ability to defend a correct point of view, and the willingness to assume responsibility for an assigned task, one can hardly expect restructuring in the units and subunits to achieve a forced-march pace, figuratively speaking. Conservative elements, which are impeding progressive reforms, are still very strong. To overcome them we need fresh replacements who are free of the vices of the time of stagnation. This is one of the main tasks of Air Forces educational institutions.

The demands of the USSR Minister of Defense, the chief of the Main Political Directorate of the Soviet Army and Navy, the commander in chief of the Air Forces, and the Military Council member and chief of the Air Forces Political Directorate, pertaining to the practical preparedness of graduates to perform their job duties in primary-level duty assignments, constitute the fundamental direction in the work efforts of Air Forces military educational institutions. But a high level of professionalism and a solid foundation of theory are not enough. Today it is no longer sufficient to train a

confident pilot or skilled engineer. Every Air Forces officer must also be an active campaigner for implementation of those revolutionary reforms initiated by our party.

A great deal has been done at Air Forces educational institutions. The process of restructuring, although it is advancing more slowly than we would like, is producing results. Nevertheless it is premature to speak of a radical breakthrough in the activities of our military educational institutions. Such a turning point has to date appeared only in general form.

One is particularly concerned by the fact that the gap between the graduate's actual level of preparedness and the steadily growing demands on the professional competence of the Air Forces officer in the broad meaning of the term is being eliminated intolerably slowly in the work activities of Air Forces educational institutions.

We are endeavoring to find a way out of this situation. In particular, at a meeting of the Air Forces Military Council the development prospects of Air Forces educational institutions were analyzed and the fundamental directions in accomplishing current tasks were defined. Improvement in the training of flight personnel, aviation engineer service, communications, and rear services specialist personnel, improvement in the combat and mobilization readiness of the schools, qualitative improvement in the methodological training of command, teaching, and flight instructor personnel, and establishment of modern training facilities at each and every school are key items.

As we see, the tasks facing Air Forces educational institutions are extremely complex and of substantial scope. They cannot be accomplished in a single, assault-like push. If to this we add that restructuring of the system of training Air Forces personnel affects the interests of many directorates and services of the main staff of the Air Forces, one can state with complete confidence that it is necessary to approach collectively resolution of problems connected with educating and indoctrinating Air Forces cadres.

The present organizational and staff structure of flight schools and their capacity provide capability to train each year a sufficient number of pilots, navigators, and tactical control officers. We cannot be satisfied, however, merely with provision of "gross quantity." It is high time to shift our scrutiny from the quantitative to the qualitative aspect. Frankly, there are plenty of problems in this area.

With the conversion over to fourth-generation jet aircraft by some subunits, shortcomings in the proficiency of young pilots have become particularly obvious. Analysis of the activities of graduates of higher military aviation schools in the first year and a half to two years of service in a line unit indicates that the process of breaking in young pilots is sometimes unwarrantedly

dragged out and delayed. Veteran flight personnel are diverted to this process, which in the final analysis harmfully affects the combat readiness of subunits. And the reason for this is lack of pilot proficiency on the part of the young lieutenants, caused in particular by the fact that at flight school they flew old-model equipment.

There would seem to be an obvious solution to the problem: schools must be provided with modern aircraft—and things will improve. In order to eliminate idle talk on this subject, I shall state unequivocally that we cannot adopt this solution at the present time. In view of the budget deficit, it is hardly warranted from an economic standpoint. The pilot cadet must be given solid skills in flying technique on simpler and more economical aircraft.

Comprehensive analysis of the existing system of training flight personnel convinces us that it will be very difficult to resolve the problems of training combat pilots on an integral basis without radical, fundamental change in the system. Judging by all indications, we cannot make do with half-measures here.

In order to ensure adequate capacity of flight schools, which meet the figured annual requirements of line units for pilots and navigators, and to ensure that these personnel have an improved level of proficiency, in our opinion it is necessary to implement a number of organizational-staff measures and to transition to a three-stage system of training flight personnel. This system consists essentially in the following.

In the first stage primary flight training should be provided for youth between the ages of 16 and 17 at DOSAAF flying clubs. The most gifted, capable youths will comprise the basic group of secondary-school graduates enrolled at higher military aviation schools for pilots and navigators. I believe this approach will make it possible concomitantly to resolve in some measure the problem of aptitude selection process as well.

The second stage would consist of basic flight training for student pilots at flight schools, learning on some one type of jet trainer. The foundation of professional skill of the future commissioned officer-pilots would be laid down during this period. During their years of training at a higher military aviation school for pilots, pilot cadets should not only acquire thorough knowledge of theory but should also obtain solid skills in daylight VFR and IFR flying, night VFR flying, should thoroughly master navigation, precision formation flying, master combat flying, and be ready to undergo conversion training to modern aircraft of other types.

At the third stage flight school graduates undergo specialized additional training at a training center, where they master the operation of combat aircraft. Thus pilots who have completed the requirements for third class will be reporting for line unit duty. In our opinion this will

help shorten and facilitate the process of combat pilot development and will help resolve a number of current problems connected with novice-pilot flight safety.

The pace of improvement of effectiveness and quality of the process of training Air Forces personnel is determined by many component elements. But I feel that one of the main elements of reserve potential in this area is improvement of the training facilities of military educational institutions, because it is for good reason that the CPSU Central Committee and USSR Council of Ministers decree entitled "Principal Directions in Restructuring of Higher and Secondary Specialized Education in This Country" particularly emphasizes that quality and intensification of the training and indoctrination process, which in the era of the scientific and technological revolution are grounded on modern training facilities, are one of the determining factors in boosting higher education.

Our best Air Forces school commanding officers—Lt Gen Avn K. Chelyshev (Kiev Higher Military Aviation Engineering School), Maj Gen Avn G. Yakunin (Kharkov Higher Military Aviation Engineering School), and Maj Gen Avn L. Kosnyrev (Vasilkov Military Aviation Technical School)—together with their active assistants, command personnel and instructors, are endeavoring maximally to improve training facilities. They do not make excuses about objective difficulties but find the ways and means to provide everything necessary for training enrolled personnel. I shall cite an example.

At the initiative of and with the direct active participation of Maj Gen Avn L. Kosnyrev, commanding officer of the Vasilkov Military Aviation Technical School imeni 50th anniversary of Ukrainian Komsomol, an excellent training airfield has been built at the school, which is a miniature version of a modern combat air base. In practical training activities the cadets, future technicians and masters of combat aircraft, have the opportunity to learn the full extent of skills needed to serve in line units. The instructors seek to ensure that graduates gain the proficiency of specialist personnel who have served from 18 months to two years in a front-line regiment.

We should like to name among the finest instructors such outstanding workers and genuine enthusiasts as Lt Col V. Nikolenko (Kharkov Higher Military Aviation School for Pilots), Lt Col A. Kravchenko (Voroshilovgrad Higher Military Aviation School for Navigators), and Lt Col N. Litvinchuk (Chernigov Higher Military Aviation School for Pilots). These officers work indefatigably, as they say. Scientific research work is moving forward thanks to their efforts and courage in the campaign against bureaucracy and resistance to change. Such instructors must be supported in every way and be given the opportunity to innovate.

At the same time performance evaluations indicate that service schools still contain many faculty members who see the significance of scientific work only in personally

defending a candidate's or doctoral dissertation. There still occur shameful instances where beautifully-equipped training classrooms are unavailable to the students, are kept under lock and key, and are opened up only for boards of inspection. One might naturally ask whether actions geared to show and pretense, fraud and falsification are not costly in a material and moral respect. We are waging and will continue to wage a resolute, uncompromising campaign against such phenomena. We are focused on this by the resolutions of the 19th All-Union Party Conference.

Speaking about boosting the level of proficiency of combat pilots in a professional, tactical, technical, and flight performance respect, we cannot ignore the problem of training and service of flight instructor personnel at Air Forces schools. According to the requirements of guideline documents, initial selection of candidates for the position of instructor pilot is made in the training regiments, as a rule from second-year leader-group cadets, those who are assimilating flying and theory most successfully and who show a proclivity toward teaching and indoctrination work. Proposed candidates are discussed at the regimental methods council. As training progresses their senior comrades are to continue closely studying their moral-political, psychological, and pilot qualities.

This is precisely how they proceed at the Kacha and Borisoglebsk higher military aviation schools for pilots. As a result they show a comparatively high level of instructor personnel job proficiency.

We must acknowledge, however, that selection of candidates for instructor pilots is not at an adequate level at all flight schools. Frequently it is allowed to drift aimlessly, with lip service given to organization, in a haphazard manner. As a result persons with neither ability nor desire are sometimes appointed instructors. One might ask just what such instructors can teach student pilots. One can only wonder about those command personnel who, to put it mildly, fail to have a serious attitude toward selection and indoctrination of those specialist personnel who train our fledgling pilots.

The problem of preparing instructors also has another aspect, about which until recently people generally preferred to keep silent. It is essentially the following.

It is no secret that the prestige of the job of instructor pilot at an Air Forces school has declined sharply. Incidentally, attesting most eloquently to this is the fact that graduates make every effort to avoid being made instructor pilots. What is the problem? The point is that pilot cadets see all too clearly the very difficult conditions in which their instructors work. The work load borne by these officers is immense. Their workday runs a minimum of 11-12 hours. There are duty details on days off and holidays. In addition, up to 8 months out of the year an instructor is working at a field-type pilot training facility, away from his family. As a rule he goes on leave in winter. And he receives no special benefits or

special compensation. In addition, the majority of field-type pilot training facilities lack adequate conditions for the officers to get full and proper rest.

One might respond that an officer serves not for benefits but for an idea, that he must staunchly and courageously endure the difficulties and privations of military service. Unfortunately one frequently encounters such demagoguery. And it is frequently spouted by those bureaucrats who do not experience any problems with their living conditions and daily lives.

The conscientious and selfless service of a Soviet officer is indeed measured not in rubles but in level of security of the homeland. But it also goes without question that a person who is carrying out his sacred duty to defend the borders of the homeland, who is serving under difficult conditions, is entitled to count on society showing concern for him. It has long since been proven that economizing at the expense of people's standard of living produces no good. In the final analysis losses will be higher.

I am convinced that it is high time to think about how to provide moral and material incentive for the instructor pilots, engineers and technicians servicing student pilot flight operations. It is past time when this could be done with slogans and appeals alone, for exploitation of people's enthusiasm went on for too long during the years of stagnation.

A new training year has begun at military educational institutions. Many schools have proceeded to teach with new curricula and training programs. It is the task of command personnel and instructors clearly to understand the substance of the changes which have been made in teaching the various training subjects, to restructure efficiently while on the march, as they say. Everything new and progressive, which provides the opportunity to improve the effectiveness and quality of learning, should be adopted. Movement forward to the heights of military proficiency is impossible without this.

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Fighter Regiment Party Committee Secretary Interviewed

91440095b Moscow AVIATSIYA I KOSMONAVTIKA
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[Interview, published under the heading "Delegates to the 19th All-Union Party Conference Speak," with Gds Lt Col B. Vorobyev, guards fighter regiment party committee secretary, by AVIATSIYA I KOSMONAVTIKA editors: "The Times Demand Concrete Results"; first two paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] The 19th All-Union Party Conference was an important milestone in implementing the ideas of perestroika, in resolving the problems of democratization of party affairs, and in enhancing the role of elected party bodies.

The editors asked one of the conference delegates, Lt Col B. Vorobyev, a guards fighter regiment party committee secretary, to reply to questions of interest to this journal's readers.

[Editors] Boris Mikhaylovich, we should like to begin this interview with a statement on one of the most important issues of concern to many Communists today: how can methods of party influence be applied more effectively without usurping the functions of professional interrelationships in Air Forces units?

[Vorobyev] That is an important question. As was emphasized at the conference, all party organizations are called upon to operate within the framework of the USSR Constitution and Soviet laws. This means that we must put an end to the adoption of party committee decisions which contain outright orders to governmental, economic management and administrative agencies and public organizations. The party carries out its policy via Communists working in agencies of governmental authority and in all domains of societal affairs.

A substantial restructuring of the activities of primary party organizations has been called for. In the conditions of the military, primary party organizations, which constitute the political nucleus of each subunit, should not usurp the functions of the leader personnel of Air Forces collectives. Operating primarily through party members and working with personnel, party organizations should seek to ensure that every collective carries out its assigned functions in full measure and exercises its democratic rights. I see the significance of political leadership not in party organizations assuming management and administrative functions, which unfortunately is still frequently observed in practice. On the contrary, the task consists not only in not usurping the functions of leader personnel but in helping them mobilize personnel to carry out specific tasks, and preventing the occurrence of irresponsibility, complacency, negligence, and an attitude of immunity to normal rules and regulations.

Recently party committee members were working in the party organization of which a Communist by the name of Babkin was a member. They were examining a specific question: how was the squadron party buro influencing the activities of the party organizations of the flights. It was ascertained that this influence was more in form than in content. Leader-Communists almost never looked into these matters. The party buro secretary was unable to reply in detail to the question of what assistance had been given to the party activists of the flights.

I am angry at myself for the fact that we failed to address this problem sooner. We have now resolved it, and changes are already in evidence. The system of party assignments, presentation of accountability reports, and personal evaluations of the performance of party members is being better utilized in the squadron in the interests of the primary party components. And the party committee now sees that it is necessary to develop these

interlinkages: the primary party organization should prompt the activities of the lowest-level party organizations in the interests of the main goal—a continuous state of combat readiness on the part of the subunits.

From this point of view we in the regiment are reexamining the role of party meetings, party committee meetings, and of each Communist in implementing party decisions. For this reason we are seeking to reestablish an atmosphere of openness, criticism and self-criticism, party comradeship and discipline, collectivism and personal responsibility for the end results of military labor.

[Editors] One should also note the improved style of party direction of the training and indoctrination process.

[Vorobyev] We see as the way to success in combat and political training of our military aviation personnel stepping up the activities of primary party organizations and reaching each individual military airman. And this task is being accomplished not only by leader-Communists and party committee members. There are numerous elected-body activists in the unit; there are people who perceived before others the significance and requirements of perestroyka. There are many such individuals. Guards Lieutenant Colonels Mozgovoy, Romanov and others constitute a reliable support of the command element and party committee in work pertaining to further increasing the unit's combat readiness.

While some general training results are not bad, nevertheless certain party organizations are insufficiently aggressive in their efforts to combine and intensify training classes, to make training drills more effective and to improve quality of flight operations.

A great deal has been done in the regiment since the 19th All-Union Party Conference to increase the creative initiative of flight personnel, engineers and technicians, and to direct the efforts of military personnel toward exemplary performance of air, weapons, and tactical training, toward strengthening organization and discipline, and ensuring flight safety. The new approaches have helped us step up the activities of the primary party organizations of the squadrons and technical maintenance units and increase their contribution toward improving the unit's combat readiness.

For example, we have begun holding special training conferences at the regimental level to improve the methods and instructor skills of flight commanders. The question of more effective pedagogic involvement by leader-Communists in training this category of Air Forces personnel was examined in detail at an expanded meeting of the party committee. At the suggestion of the party committee, party organization secretaries began to be invited to attend training conferences together with the flight commanders. Gaining knowledge of the fundamentals of military education science and methods of improving the quality of job-specific pilot training, they

are organizing the activities of the subunit party organizations in a more specific and businesslike manner. The most effective combat tactics and techniques and optimal solution variations are synthesized at these training conferences and subsequently are made available to all pilots.

As practical experience indicates, new methods of working with personnel, maximally in conformity with present-day demands, have been approved in the line units recently, especially since the 19th All-Union Party Conference. Some of our Communists, however, working in the squadrons and the technical maintenance unit, are getting back in the old rut and are being too slow about overcoming the inertia of old, long-since condemned approaches. For example, during the current training year, in the squadron commanded by Guards Lieutenant Colonel Kholodilin, staff officers paid several personal inspection visits and rather thoroughly studied the situation within the squadron. In particular, they repeatedly submitted reports to the command element and at a party committee meeting about mistakes by the squadron commander and his deputies in training junior aircraft servicing and maintenance personnel, a lip-service approach to organizing training classes and technical training drills with these personnel, and a low level of process discipline in some of the servicing and maintenance groups. But essentially things did not go beyond fact-finding and reporting of facts.

For some reason the staff officers also failed to draw attention to the following. The squadron commander was an experienced, energetic officer, but he was too one-sided in his efforts. He directed all efforts primarily toward combat training. This produced results: the men performed smoothly at tactical air exercises and when flying practice missions on the range. While concerning himself with improving the level of air, weapons, and tactical proficiency, however, the commanding officer kept his attention away from political indoctrination work to a certain degree. It boiled down to brief talks with the men, sometimes on abstract subjects. There were also many deficiencies in organization of political instruction classes.

The command element and party committee were compelled to give prompt, effective assistance to the squadron commander, squadron political worker and party organization. Through joint efforts we are setting things right in the subunit. Party and Komsomol meetings were held in each flight and in each group; party members from regimental headquarters and members of the regimental party committee attended and spoke at these meetings. They discussed with the squadron party members how to normalize the situation in the squadron and how to improve the quality and effectiveness of party political work and the entire training and indoctrination process. The squadron commander gave a status report at a meeting of the party committee. They not only pointed out his mistakes and errors of omission but also offered him concrete assistance.

In this connection I should like to discuss the following. It was noted in the remarks presented by delegates to the 19th All-Union Party Conference that restructuring of party work is being impeded today by lack of competence, a failure to understand the party's tasks, and an inability by leader personnel to organize and gather together like-minded persons and to ensure personal exemplariness on the part of party members. Eradication of a lip-service approach is being hindered by inertia of thinking at higher echelons, because unfortunately the main evaluation criterion and work performance indicator is at the present time not the end result but rather intermediate figures and rosy reports. Another impeding factor is fear on the part of lower-echelon party officials to restructure themselves before this is done at the higher echelon: there prevails a feeling of danger to one's own welfare. For this reason old forms of work and performance evaluation criteria are still being preserved. It is easier to engage in paper shuffling than to work with personnel, for it continues to be the case that papers are checked more frequently than the result of working with a party member. This result is not apparent immediately, while a check mark on a plan target sheet is visible and pleases inspecting personnel.

Perestroyka is also being impeded in our regiment and in like military units by old approaches to organizing political indoctrination and all ideological work. The regimental morale officer [progagandist] alone has dozens of plans and schedules. The squadron deputy commanders for political affairs, the technical maintenance unit political worker, and the subunit party and Komsomol organization secretaries also have such plans and schedules. Most frequently they are duplicative of effort. And if one counts up how many individual measures are scheduled, it turns out that two and sometimes three a day must be performed. Of course a resolute effort must be made to correct this situation. We should consider not quantity but quality, follow-through, job innovativeness, and zeal.

[Editors] Boris Mikhaylovich, speaking of increasing the effectiveness of party influence on the training and indoctrination process, we would like to have you comment on those problems which are of concern to your party members and yourself as party committee secretary.

[Vorobyev] Following the 19th All-Union Party Conference we succeeded in appreciably enhancing the prestige of the primary party organizations and their influence on the affairs of the subunit. And primarily because the elected-office body of activists proceeded to work at full effort. Our work has become more interesting, because return on effort has become more tangible, and party committee recommendations are being more promptly implemented rather than becoming mired down in the speech-presentation process, as in the past.

At the same time it became more difficult to work, since demands on the party committee by the lowest-level party elements are growing in the same proportion in

which our demands on those elements are growing. What is the essence of these demands? What help do the activists expect of us? We held an expanded meeting of the party committee in order to obtain answers to these questions, inviting subunit commanders, political workers, and activists to attend. In my opinion a frank and mutually beneficial discussion took place. For example, they asked why it is that Communists and the party committee are not always sufficiently firm in assessing the activities of certain officials. Why is it that members of the headquarters party organization take little part in ideological-political indoctrination of personnel? Individual party committee members were also criticized. In particular, for the fact that they pay little attention to the concerns of the secretaries of the party and Komsomol organizations and merely issue orders when specific advice and genuine assistance are needed.

We now regularly make an individual evaluation of the performance of each party member for each month and training period. We consider not only the successes of the officer and warrant officer proper in combat training and the achievements of his subordinates, but also how they are carrying out party assignments, are taking part in their unit's volunteer activities, and whether they offer their fellow soldiers an example of discipline and composure.

I shall state frankly that not all party members were happy about the restructuring being carried out by the party committee or about the atmosphere of demandiness and firm integrity which is gradually taking root in the unit. This is understandable, for it is much simpler to revamp work forms and methods than to change people's psychological makeup and to compel them immediately to renounce accustomed stereotypes of thinking. This is a lengthy and complicated process. When it comes to words, all of us are in favor of resolutely sweeping away the old and obsolete in party work, in organization of the training and indoctrination process, of adopting progressive forms of training Air Forces personnel, and of campaigning for effective utilization of each and every hour of classroom and flying time. But when things get to concrete actions, we encounter a conflict: the leader-Communist, unable to think in the new way and lacking a developed sense of responsibility, is unable to work in the manner that is essential today. And we can see only one solution: to work patiently, persistently, day by day on the individual indoctrination of each party full member and probationary member.

The effectiveness of party influence increases if party organizations draw all aviation personnel into the affairs of their units, unite their efforts, and organize harmonious, common-cause efforts by all military personnel. Our errors are sometimes predetermined by the fact that we are unable to maintain and develop democratic processes and fail to consider the actual situation. We sometimes are guilty of a single approach to all problems and to all categories of Air Forces personnel. But perestroika requires initiative and flexibility and a heightened sense of the new.

The mechanism of inhibition has not yet been eliminated in the work of some of our party organizations. In many instances the party committee and party buro fail to ensure a vanguard role by party members, sometimes fall behind new tasks and are late in exerting party influence on the processes of perestroika and on increasing the militance of the party organization.

[Editors] Tell us, Boris Mikhaylovich, what is being done in the regiment to increase the militance of the squadron party organizations.

[Vorobyev] During the time following the conference we have had several opportunities to become convinced that the militance of the regimental party organization and strengthening of its influence on all aspects of life in the unit depend primarily on how party members carry out adopted decisions. For example, the subunit in which Guards Captain Kucherov serves as executive officer has a good reputation in our regiment. They have done a good job of organizing the training and indoctrination process, the number of disciplinary infractions has decreased appreciably, and personnel are leaders in socialist competition. I can say without exaggeration that a good deal of the credit for this goes to the party organization and its leader, Guards Major Dyatlov. Party members have become accustomed to being true to their word and seek to ensure execution to the letter of each and every point of decisions passed at meetings. Such forms of verification as presentation of reports by party members and regular briefing of party organization members on how planned measures are being carried out are extensively utilized.

The militance of our party organizations is manifested in the effectiveness of their influence on all aspects of regimental life and combat training activities. Forming in people a profound understanding of the substance of the turning-point nature of our time, a new attitude toward things, and consequent help in maintaining a high degree of unit combat readiness constitutes the main criterion of genuine party influence. And its strength is determined by personal exemplariness in job performance, training, discipline, and active participation by each and every party member in indoctrinating military personnel. Of course one can hardly speak of party organization militance if there is no end result to the work performed.

I believe that in order to speed up perestroika, to ensure a vanguard role by party members, and on this basis to increase the militance of party organizations, it is necessary resolutely to renounce general appeals and shift to working with specific individuals. Today we in the party committee endeavor to analyze in detail how things are progressing with development and further deepening of intraparty democracy, glasnost, criticism and self-criticism, and strengthening of party discipline.

The new approaches to increasing the militance of squadron party organizations are in many places not in evidence. Contributing factors of course include the fear of making mistakes, sluggishness and inertia in thinking

and acting. But the main reason is apparently not so much laziness and slipshodness as a poor degree of job-related training on the part of certain party workers and their inability to organize in a practical manner. There are still many activists who, due to their devotion to the old ways, fail to appreciate the significance of the new forms and content of party political work in conditions of glasnost and development of democracy. Some of our flight party organizations have become accustomed to the role of recorder and are not acting as an organizer of perestroyka; in simple terms, they are moving at the tail end of events. It is our duty to help them get off the beaten track as quickly as possible. This will benefit the common cause—the regiment's combat readiness. And we shall carry out with honor our principal military and party mission.

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Pilot Safely Lands Stinger-Crippled Aircraft
91440095c Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 9, Sep 88 (signed to press
5 Aug 88) pp 10-11

[Article, published under the heading "They Were Decorated by the Homeland," by Col Ye. Besschetnov: "Political Worker's Courage"]

[Text] Squadron deputy commander for political affairs Maj A. Rybakov, of medium stature, lean and of athletic composure, stepped out of the bus which had brought the pilots to the airfield and headed toward his aircraft—a ground-attack jet, on which the maintenance people had been working since the previous evening. Catching sight of him, the technician [crew chief] saluted and reported that the combat aircraft was ready. "Well, have you patched the dushman [Afghan rebel] shell hole?" the political worker asked.

"Yessir, major," the lieutenant smiled, always pleased to converse with Aleksandr Borisovich.

On the previous day, while flying a night mission with an element supporting Afghan troops who were heavily engaged near Ali Khel, Rybakov had come under dushman fire while dropping battlefield illumination flares. A round from a mountain-version antiaircraft gun holed the ground-attack aircraft's left flap.

While he had full trust and confidence in the diligent, conscientious maintenance people, Rybakov nevertheless carefully checked to see whether they had properly patched the skinholes. Satisfied, he thanked the men for their efforts.

Realizing that the political worker was about to go up, the aircraft technician asked: "But what about your trip home, major?"

The fact is that Rybakov was supposed to be departing by air today for Tashkent, where he was to be given entrance examinations by a field examining board for admission to the Military Political Academy imeni V. I. Lenin. Things had gotten busy, however. There was a lot of combat flying to do, and they were short of pilots, so the commanding officer decided to delay his departure by several days.

Noting the crew chief's sincere interest, Aleksandr Borisovich confided: "They promised to let me leave as soon as the combat flying lets up. In the meantime we'll do some fighting...."

On the first sortie the command flight, in which Major Rybakov flew wingman to the squadron commander, bombed and strafed a dushman base camp on a high plateau. After two passes this "hornet's nest," containing as many as 500 rebels and large quantities of weapons, combat equipment and ammunition, was engulfed in flames and smoke. "One less counterrevolutionary base," the political worker noted to himself with satisfaction.

The ground crews quickly turned the aircraft around to go out again. This time they had to head back to Ali Khel and provide close air support to Soviet ground troops which had come to assist Afghan infantry engaging a large rebel band.

There were cumulus clouds here and there, but visibility was good. The sharp shadows cast by the clouds covered with dark spots the tumbled blocks of mountains passing beneath their wings. They reached the combat area.

"Heavy dushman fire from strongpoint. Coordinates....," the forward air controller radioed.

"Roger. We'll adjust fire on your corrections," replied the element leader.

The four attack aircraft headed swiftly for the target. The pilots launched rockets at maximum range.

"Adjust your fire 20-30 meters eastward," the FAC radioed.

The flight swung around and began a second pass. Major Rybakov, slightly behind the leader, put his pipper on the target—a heavy machinegun crew—and, following the practiced procedure, first fired a number of rockets, and then, when he was closer, released his bombs and immediately pulled back on the stick, breaking away.

"Pop flares, pop flares! Initiate evasive maneuver!" the FAC's alarmed voice came over the radio.

The pilot released two IR decoy flares, attempting to divert the missile from his aircraft. But apparently the FAC had warned him too late. The aircraft was suddenly

shaken by a powerful impact. Aleksandr Borisovich felt warm blood streaming down his face. Blood trickled onto his visor and flight suit, spattering into his lap.

"Grigoriy, I seem to be wounded," Rybakov radioed the squadron commander, who was leading the element.

"Report your precise status!"

The squadron commander's firm and decisive voice brought Rybakov back to reality. Peering through the obscuring film of blood, he quickly inspected the cockpit. There was a hole in the canopy. A heavy stream of air was rushing in, making it hard to see the instruments. But his mind, focusing on the mission, had not yet switched focus, but was concentrated on the thought of pummeling the dushman. After briefly reporting his status, Aleksandr Borisovich requested permission to fly another run on the target....

"Negative! Negative on target pass!" the commanding officer ordered emphatically. "Everybody return to base."

At this moment Aleksandr Borisovich noticed that his thrust was dropping off: his left engine had shut down. It was quite possibly on fire. The pilot throttled back all the way, shut off fuel, and smoothly applied full throttle on his good engine. The unbalanced thrust caused the aircraft to veer sharply. He had to apply extreme force to keep the aircraft from swinging left.

As he was engaged in these efforts, the aircraft suddenly plunged into clouds. Visibility dropped to zero. He could see neither mountains nor sky. And he was getting no readings from his performance and navigation instruments. Aleksandr Borisovich felt that the aircraft was about to enter a spin. Would he have to bail out? He wanted very badly to get his crippled aircraft back to the base!

Combat had time and again tested his professional competence. He sought to accomplish results on every mission, with maximum effectiveness.

...Dushman marksmen, lying in ambush in a rock cleft in the Panjshir gorge, waiting for the approach of a truck convoy carrying motorized riflemen, proceeded to fire on the convoy. The convoy was forced to halt. A two-aircraft element flown by the squadron commander and his deputy commander for political affairs was immediately dispatched to provide the convoy with air cover.

They reached the gorge and spotted the narrow, winding road, barely visible from their altitude. The pilots quickly spotted the trucks. But where were the snipers positioned? Establishing communications with the officer in charge of the truck convoy, the squadron commander radioed: "Request you mark the targets."

Red flares, streaking upward from the valley floor one after the other, descended over a steep slope near a deep rocky cleft. The descending flares pointed to the snipers' position....

Following the squadron commander's lead, Major Rybakov nosed his aircraft over and dove at the target. The snipers were hiding behind rocks about 300 meters above the convoy. Aleksandr Borisovich put his piper onto the target and, reaching the release point, pushed the bomb release button. The bombs released from the pylons and, following a curving trajectory, trailing the lethal ordnance released from the squadron commander's aircraft, impacted right on target. Powerful explosions shook the mountains. Loosened rock fragments tumbled down the slopes, burying the dushman weapon positions.

"How are things now?" the element leader queried the truck convoy OIC.

"Great, 'rooks' [grach; military slang for Su-25 Frog-foot]! Thanks a lot. We'll be moving along...."

The mission was completed, but they had not yet expended all their munitions, and they were still carrying considerable fuel. Therefore the pair, circling counterclockwise, spent the next 15 minutes orbiting above the mountains, providing air cover to the convoy, which was stretched out along the winding mountain road. If the dushman had set up an ambush anywhere out ahead, the pilots would hit them. There was no need to employ their weapons further, however. The pair headed back to base after the convoy had reached a safe stretch of road.

There were many memorable flights! Rybakov always emerged victorious from difficult situations. But what about now, with his aircraft having sustained serious damage? He would endeavor to utilize his skill to the utmost.

Still in clouds, Aleksandr Borisovich determined from a backup instrument that the aircraft was losing airspeed from an excessively nose-high attitude. Endeavoring to prevent the aircraft from stalling and entering into a spin, he reduced the angle of attack with a vigorous forward movement of the stick, established a rate of descent, and brought the wings level. The aircraft continued to nose left. But airspeed was gradually increasing. After reaching satisfactory airspeed, the pilot brought his aircraft into level flight using the rate-of-climb indicator, holding the aircraft from veering left, and then established a gradual climb. Three more minutes passed before he was out of the clouds. Now flying above even, solid cloud cover, he reestablished his directional orientation using the sun and, switching on his transponder and setting the distress code, so that radar could pick him up, he headed toward Kabul, to the nearest alternate field.

"Report your status!" Rybakov heard the voice of the squadron commander, who was trailing him somewhere off to the side.

"Right engine providing thrust, but my instruments are out."

"Follow me!"

The squadron commander moved out ahead. "Thanks for the assistance!" Rybakov silently thanked him.

He had been able to keep the crippled aircraft airborne, but it was hard to say whether he could land it safely. As Aleksandr Borisovich guided his aircraft toward the field, he was bothered by troubling thoughts. What if this turned out to be his last flight? No matter how difficult the situation, the officer did not even consider abandoning the aircraft to save his own skin.

...Aleksandr Borisovich was born in the community of Karavayevo in Kostroma Oblast. Upon graduating from the 10-year school, he did his tour of compulsory military service as a rifleman in the Order of Lenin Moscow Military District. Made fit and conditioned by his military experience, he then enrolled at the Yeysk Higher Military Aviation School for Pilots. He then served for several years in the Transbaykal Military District. Here he advanced from a fighter-bomber regiment pilot to flight commander.

Two years ago Rybakov was made squadron deputy commander for political affairs. In a short period of time Aleksandr Borisovich has proven himself to be an excellent political worker. He works in smooth coordination with the squadron commander and maintains close, businesslike contact with party and Komsomol activists. The party and Komsomol organization secretaries come to him for advice, share their problems, and give suggestions. This political worker has the solid respect of squadron personnel. He is concerned with the men and their interests.

Squadron personnel like and trust Rybakov. Every word he utters has the weight of authority. They listened to his report intently, for example, at a party meeting with the agenda "Remember that your name is Communist." Aleksandr Borisovich's words struck deep into the heart of every pilot and technician. This political worker had the full moral right to appeal to the feelings and conscience of party members and all personnel, to call for courage and selflessness, because he himself served as an example in all things.

But what about now? How will the flight end? Rybakov could not abandon and did not have the right to abandon the crippled aircraft. It was obeying his commands and staying airborne. He had to land it! He had to do everything possible to save this expensive aircraft.

...As he was approaching the field he contacted the tower and requested clearance to make an emergency landing. He was cleared to land. When he reached gear-extension airspeed he set the landing gear selector switch to gear down. But nothing happened. He glanced at the pressure gauge and realized what was wrong: the needle was on zero, meaning there was no pressure in the hydraulics. He performed the emergency gear extension procedure, but without success. This was some bad luck! Not only was one of his engines out, but now the gear would not lower! And he was still carrying a fair load of ordnance. The officer knew that it would be difficult to land the crippled aircraft, but he had not figured on being without landing gear at this critical moment.

He aborted his approach and went around. In spite of the considerable danger, Aleksandr Borisovich decided to try a gear-up belly landing on an alternate dirt strip. He informed the tower of his decision. He smoothly set up his final approach and established his pitch attitude for touchdown. One second passed, two seconds, three....

His nerves were strained to the maximum. His airspeed was about 300 km/h. Rybakov braced his left arm against the instrument panel to avoid striking it, keeping the aircraft from a dangerous slip angle with his right hand.

Touchdown! After plowing about 400 meters of ground, the aircraft swung to the right and, after several seconds, came to a stop.

"Get out of your aircraft immediately!" Aleksandr Borisovich heard a command from the tower.

He proceeded to unbuckle his parachute harness, but his hands were trembling from the strain of landing and refused to obey him. He tried to calm himself. Finally he succeeded in getting the buckles to release. Opening the canopy, the pilot jumped down to the ground. As he ran from the aircraft he suddenly remembered that he had forgotten to shut down the engine. The aircraft might burn up. He forced himself to go back to the aircraft, which was about to explode, climbed into the cockpit, and closed the throttle. He breathed a sigh of relief as the turbine rpm began to drop. There was now no more danger....

Moving 10 or 15 meters back from the aircraft, he dropped to the grass, to the safe, welcoming ground. By this time others were reaching the scene. An ambulance screeched to a halt. A minute later he was being embraced and congratulated on his safe return. A doctor immediately proceeded to treat his facial injuries.

The exploding Stinger missile had wrecked his left engine, sent fragments through the cockpit canopy, and had done some skin damage. Of course the gear-up landing had also done some damage. On the whole, however, the aircraft had survived and, after repairs, would be returned to service.

Aleksandr Borisovich, as he was departing for his home field, bade the attack aircraft farewell as if it were a living being. He thanked it for its reliability, for not letting him down in an emergency, and for enabling him to save his life.

Rybakov was awarded a coveted government decoration for his heroic deed in the skies over Afghanistan.

Upon his return to the homeland, Maj A. Rybakov, bearer of the Order of the Red Banner and Order of the Red Star, was transferred to a squadron of expert combat pilots. His long-held dream also came true: he enrolled in the correspondence division of the Military-Political Academy imeni V. I. Lenin. Formal study, in combination with his practical work activities, is helping him acquire the diversified experience and know-how of a political worker who is a genuine implementer of party policy among the troops. This officer is on his way. His future holds the promise of new outstanding combat exploits.

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Fighter Regiment Tactical Control Team Training
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[Article, published under the heading "Great Vigilance, Continuous Combat Readiness," by Master-rated Col V. Obukhov: "The Command Post Carries Out the Decision"]

[Text] The fighters were heading back to base upon completing a training sortie. At that moment the field began to be fogged in. By order of the flight operations officer, the command post team, headed by Gds Maj G. Antipov, assessed the situation and took the necessary measures to divert the aircraft to an alternate field.

Tactical control officer Gds Capt A. Zhigulskiy quickly determined the new heading and a safe altitude. Precisely executing the command post instructions, the fighters landed safely.

The command post team plays an important role in controlling aircraft and their performance of training sorties, and in ensuring flight safety. The importance of an efficient, well-coordinated work performance by command post specialist personnel has become even greater as fourth-generation aircraft have entered operational service with the Air Forces.

Controlling flight operations from the ground is a very complicated business. Combat training operations encompass a large, deep block of airspace, and aircraft are flying at high speeds. The air situation is constantly changing. Sometimes it is difficult to predict how it will develop. The importance of the time factor, of instant reaction, and the element of surprise, with aircraft

swiftly reaching the range at which they open fire, has greatly increased. All this demands of command post specialist personnel exceptional composure, attention, speed of reaction, psychological fortitude and professional skill.

This is eloquently attested by the work experience of Guards Major Antipov and his men, who are called upon in a short period of time to evaluate a large volume of information, to select the main elements from this information, clearly to formulate a plan of action and nature of actions in order to assist aircrews in carrying out a combat training mission.

Take, for example, an air intercept. The principal role here is played by the pilot's combat skill, professional experience and know-how. At extremely high airspeeds, however, and in adverse weather conditions, he can find and destroy a target only with close coordination with the command post team. And the slightest mistake by any command post specialist threatens success of the mission.

Command post teams also perform many other complex tasks on a daily basis. Principal tasks include: analysis of the weather at the home and neighboring airfield, organization of continuous radar monitoring of the air situation, passing off and receiving control of combat aircraft, provision of vectoring guidance, monitoring of flight duration, guidance of aircraft to their destination field, and rendering of assistance to pilots in a difficult situation. How these tasks will be performed depends first and foremost on a high degree of specialized training on the part of the command post team, and precision performance by each individual of his job duties.

The experience of command post chief Gds Maj G. Antipov confirms that precision performance by his subordinates is due in large measure to thorough preliminary preparations for flight operations. During these preparations the command post team, together with the pilots, studies in detail the tasks and specific features of a flight operations shift, the flight operations schedule, refines and details finer points involved in fighter guidance vectoring, etc.

When they are about to go on duty, Gds Capt N. Baranov, A. Romanovskiy, and the other tactical control officers thoroughly study the appropriate flight operations manuals, cloud penetration and landing approach procedures, verify the time of onset of darkness and dawn, maximum allowable airspeeds in relation to specified restrictions and limitations, manner and procedure of assisting aircrews in distress, as well as other items.

Regimental chief of staff Gds Maj A. Tsyganenko and the unit's senior navigation officer, Gds Maj V. Bazhenov, organize training activities with the command post team according to the following principle: from the simple to the complex, from the complex to the highly

complex. Personal contacts with the aircraft commanders help the tactical control officers more thoroughly study flight personnel and get to know the psychological mood and attitude of the combat pilots.

In order to ensure success it is very important for the pilot and the command post team thoroughly to practice coordination in joint actions. They devote considerable attention to this during preliminary preparation. For example, combined practice drills in the tactics classroom are highly beneficial. Air-to-air combat in a dynamic environment is simulated directly on the equipment: route movement of targets is recreated, and jamming is employed.

In the course of such practice drills the pilots, together with command post personnel, work on scenario instructions prepared by headquarters. On the instructions of the training instructor, at a certain moment during a simulated flight the pilot informs the simulated command post of change in the tactical situation. Tactical control officer Gds Sr Lt V. Gerasimenko or another tactical control officer makes the necessary calculations, makes an optimal decision, and issues appropriate commands to the pilot, who carries them out. After this the training instructor conducts a detailed performance critique, analyzes the actions of both parties, and summarizes results of the joint training session. All this helps develop precision coordination between command post and pilot, for the tactical control officer has a clear picture of the conditions of flying and combat employment of a modern fighter, while the pilot is familiar with the procedure and specific features of guidance vectoring in various tactical and jamming environments, taking into account the job proficiency of a given command post specialist.

Guards Major Tsyganenko extensively utilizes training equipment at such practice sessions. He employs diversified means and methods to form emotional-volitional stability in command post personnel and to increase their psychological conditioning. These methods include solving tactical problems with insufficient time available and incomplete information on the "aggressor." Creation of situations requiring that tactical control officers make critical decisions and simultaneous assignment of several tasks of varying importance, complexity, and execution timetable have proven effective. Special attention is devoted at these sessions to specialist personnel who lack sufficient practical combat operations experience.

On one occasion the regimental chief of staff assigned a young tactical control officer the task of sequentially vectoring two fighter pairs to their targets, after which they were to land at an alternate field. The fighters took off. The officer was given the azimuth, range and altitude of the aircraft, as well as the coordinates of the targets. The mock air-to-air engagement went well. All that remained was to send the aircraft to the alternate field. At this point the tactical control officer made a mistake. He gave instructions to one pilot while watching the

other, and all because control of the fighters had been handed off in a poor manner. Fortunately the command post chief came to his assistance in time.

Drawing the proper conclusion from this incident, now on the eve of flight operations all command post officers thoroughly study each flight operations schedule variation and always determine the number of simultaneous guidance vectorings and the total number of fighters which will be on the ground waiting for command post instructions. After this officers N. Baranov, A. Romanovskiy and the others analyze and jot down in their notebooks those maneuver sequences in which they will be vectoring pilots, control handover points, possible aircraft vertical separation, and write down their identifying numbers in large, easily-readable characters. They make effective use of sequences derived at practice drills as well as optimal graphic solutions recommended by the regimental methods council. Skilled, precision employment of means of automated control enables them maximally to utilize the combat capabilities of the modern combat aircraft and effectively to control air combat at various altitudes and weapons delivery ranges. At the same time the availability of automated control systems increases demands on the level of specialized knowledge of all tactical control specialist personnel.

In order to ensure flight safety during the conduct of flight operations, the command post team led by Guards Major Antipov always takes prompt and timely measures to prevent aircraft collisions, to prevent aircraft from entering restricted airspace, and to prevent violation of regulations governing air operations.

The tactical competence of each specialist is of great importance in the combat proficiency of the command post team. Of course predictable pattern and unnecessary situation simplification are out of the question. It also goes without saying, however, that many individual phases of a combat engagement can and should be worked out in advance. The greater the number of thoroughly worked-out algorithms, the higher the probability of success. That is why the command post people attach great importance to this.

Brief tactical drills help in devising and in practical assimilation of such specific formulas, for selection of a correct tactic when executing an intercept, for example, is the result of a high degree of professional competence both on the part of the pilot and the command post team, and thorough knowledge of the capabilities of the aircraft, armament, and guidance assets. The diversity of tactics which the adversary is capable of employing (attacks from different directions and at various altitudes, employment of diversionary elements, combined jamming, and deceptive maneuvers) obliges flight personnel and command post specialists to work persistently on mastering methods of combating threat aircraft, perfecting professional skills, to possess thorough knowledge of flying procedures, to have a clear picture of intercept dynamics, especially in the final phase, and to

be fully armed with tactics, in order at the proper moment to be able knowledgeably to select the optimal, most effective tactic, in keeping with the specifically developing situation.

Guards Major Antipov's men, working to gain solid skills in combat operations in a complex jamming environment, are continuing to improve their skills. The experience of local wars confirms that during combat operations electronic countermeasures are extensively employed against hostile radar and communications facilities. Guards Major Tsyganenko and the regiment's other experienced methods experts skillfully teach their men advanced methods taking this into account. They prepare special tables and graphs in advance, with the aid of which one can compare the current air situation with a diagram reflecting the opposing side's plan of action. This makes it possible to determine promptness and timeliness of communicating information, accuracy of coordinates of detected targets, the manner and procedure of vectoring fighters to them, the accuracy of combat information, as well as other indices.

Meriting attention among the various methods of command post team specialized training is the individual-group method which is skillfully employed by Guards Major Antipov. In addition to conducting general group training drills, he gives his men individual assignments for independent, more thorough study of the electronic equipment, and problems of tactical theory, knowledge which must be thoroughly mastered in order to work effectively as a member of the team. As a rule such assignments are determined taking into account level of training and term of military service: a month for officers, a week for warrant officers and noncommissioned officers, and one day for primary-rank enlisted personnel. Performance of these assignments and depth of mastery of the assigned material are verified by the appropriate superiors.

Before drawing up the independent study schedule for his men, Guards Major Antipov confers with them and clarifies specific questions pertaining to independent study as applied to current tasks and period of training, an officer's work experience and his job.

He shows particular concern for young officers. He discusses in detail with them what study topics are being scheduled and in what sequence they should be scheduled, in order continuously to maintain a high degree of combat readiness on the part of the command post team and the subunit as a whole, and to organize his men's daily lives and duty in strict conformity with the requirements of regulations, and to ensure flight safety, firm military discipline, organization and order.

In their practical activities the command post chief and the secretary of the subunit party organization endeavor fully to utilize practical forms of dissemination of military technical knowledge. An important place is occupied by technical briefings. Twice each month the most

knowledgeable leader-Communists brief the officers on the latest developments in Soviet and foreign aircraft and modes of their employment. Considerable importance is attached to studying the potential adversary. Discussions are held with the officers on knowledge of offensive air weapons and tactics and their development prospects.

Measures which add to and deepen the men's knowledge obtained in the process of commander training and independent study are carried out at the initiative of and with the active participation of the party committee. Technical knowledge lecture agencies are operating, in which the following officers are actively working: Military Pilot-Expert Marksman V. Basov, Military Pilot 1st Class A. Kononov, and others. Scientific-practical and military-technical conferences are regularly held in the unit, lectures and reports are presented on the most complex operational-tactical training topics, and discussions, technical and tactical competitions, and reviews of new military-scientific and technical literature are organized. All this enhances the men's professional skills, their stick-to-itiveness and diligence in their work.

At the same time there are officers at the command post who conscientiously perform their job duties, work a great deal with personnel, but give no thought to how in the course of restructuring they can accelerate intensification and improve the quality of the training and indoctrination process in the subunit, and what must be done to ensure that the men leave each and every training class and drill enriched with new, more extensive and deeper knowledge and solid skills. This is a deficiency of superiors as well as the party and Komsomol organizations, whose duty is constantly to motivate instructors to display initiative and innovativeness.

Constant party concern with improving the tactical skills of command post specialist personnel helps develop excellent moral-fighting and military-professional qualities in them, helps enrich the arsenal of techniques and methods of air-to-air combat tactical control, and helps develop tactical thinking.

The experience of the command post party organization can serve as confirmation of this. Working together with the command post chief, it works to ensure that the subunit's specialist personnel work persistently to master tactical skills. The ways to accomplish this task are regularly discussed at staff meetings, party bureau sessions, and party meetings. The officers' progress in commander training classes and their preparation of personal self-improvement schedules is monitored. Veteran leader-Communists officers Bazhenov, Tsyganenko, and others hold instructive tactical drills and briefing sessions to assist personnel studying modern combat equipment, aircraft armament, and tactics.

The subject matter of training classes, drills and practice sessions at the command post headed by Guards Major Antipov is highly diversified and is determined primarily by the missions being performed by the command

post and the squadrons. In any case the items being worked on always take into consideration the nature and specific features of modern air-to-air combat. It is also noteworthy that the tactical environment, work pace, and problems presented at tactical drills are made steadily more complex, from one training session to the next.

Unfortunately some leaders proceed at times in just the opposite manner: new training topics are selected, while the tactical environment and situation remain the same, which has a negative effect on the creative potential of the trainees and development of their initiative and skill.

In conclusion I should like to emphasize that high quality of work performance by command post teams and their combat readiness depend first and foremost on the level of ideological maturity of the personnel involved. The political conviction and moral conditioning of military personnel constitute the foundation of their staunchness, resoluteness, and ability to surmount any and all difficulties. This helps them direct all their intellectual and physical energies toward prompt and timely implementation of the decisions of the 27th CPSU Congress and 19th All-Union CPSU Conference, toward precise, high-quality accomplishment of the complex tasks of controlling individual fighters and fighter elements in the air while maintaining adequate flight safety.

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Air Force Regiment Commander, Deputies Discuss Glasnost

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[Interview, published under the heading "Implementing the Resolutions of the 19th All-Union CPSU Conference," with Lt Col A. Saran, Lt Col F. Kutsarenko, Maj A. Sterkhov, and Maj A. Afanasyev by AVIATSIYA I KOSMONAVTIKA correspondent Lt Col V. Dolgishev: "Glasnost: Words and Deeds"; first two paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] The present period in Air Forces combat training activities is a time of practical deeds and intensive daily work to implement the decisions of the 27th CPSU Congress and the resolutions of the 19th All-Union Party Conference. Air Forces personnel are making a contribution to implementation of the ideas of perestroika with selfless military labor, further improvement of the quality of combat and political training, general strengthening of firm adherence to prescribed procedures and regulations, and increase in the combat readiness of aircrews, subunits, and units. Seeking to achieve a genuine deepening of perestroika and consolidating its positive results, Air Forces personnel are confirming their activist experiential posture by concrete deeds. But they consider rooting out existing stagnation phenomena

as rapidly as possible and in the most resolute manner, actively utilizing the processes of democratization and glasnost toward this end, to be their main task.

Our correspondent visited an Air Forces unit and asked several of its officers to tell our readers how perestroika is progressing in their unit and what problems face Air Forces personnel today. The discussion included the participation of the regimental commander, Military Pilot 1st Class Lt Col A. Sarana, political worker Military Pilot 1st Class Lt Col F. Kutsarenko, unit morale officer [propagandist] Maj A. Sterkhov, and regimental deputy commander for aviation engineer service Maj A. Afanasyev.

[Sarana] Today the question of how the processes of democratization and glasnost should further evolve is in my opinion a particularly critical one. Essentially, and this is also indicated by the proceedings of the party conference, this is the main, key problem of perestroika. I am gratified that the majority of Communists and a substantial percentage of Air Forces personnel have clearly defined their position and are confirming this with concrete deeds.

I myself have done a great deal of thinking and have reanalyzed my own work performance and that of my deputies and of the regimental command element officers. We have no waverers or doubters, and we are implementing a single policy, with a clear understanding of the responsibility resting on our shoulders.

Recently we have done a great deal to ensure that each individual has the opportunity to express his opinion and to ensure that the atmosphere in our unit is cleansed of crude governance by administrative fiat. The principles of democracy and glasnost are being tangibly affirmed. Decisions made by the command authorities in these conditions are more thoroughly thought-out, precise and, consequently, are received with greater understanding and support. Wherever we fail adequately to appreciate democratic work forms, demagogues appear, hiding behind the shield of glasnost. And yet glasnost should be directed first and foremost toward getting Air Forces personnel active, toward instilling in them a sense of responsibility, psychological willingness to take part in the affairs of the entire collective. But people must work under normal conditions to accomplish this.

It is simply inconceivable to achieve a high degree of combat readiness while ignoring the opinion and attitude of one's subordinates, to campaign for mishap-free flight operations while failing to notice whether people are in good spirits and that there are problems with their housing and living conditions. An intense pace of combat training, performance to the maximum limit, and increasing workloads on aircrews and specialist personnel of service and support subunits oblige us not merely

to treat each individual with respect but to look for his individuality and to give him fair recognition for his self-sacrifice. The main thing, and this was also discussed at the forum of our country's Communists, is to create a solid material foundation for the processes of democratization. As I see it, perestroika and glasnost signify first and foremost practical affirmation of social justice.

But at the present time things are as follows: on the one hand we have modern supersonic jet aircraft armed with potent missile weapons, as well as complex electronic equipment, while on the other hand we have shortcomings and deficiencies in living and working conditions and daily hassles in the lives of the people to whom these complex aircraft systems have been entrusted. This results in a stream of complaints. This cannot be ignored.

I shall once again mention the resolution of the 19th All-Union Party Conference on creating a material foundation for the processes of democratization. This means not only the physical investment of funds but also a decisive reevaluation of the present situation, an innovative approach, initiative and ingenuity on the part of the military collective. We are concentrating our efforts precisely in this area.

[Kutsarenko] Glasnost is like gravity for a cosmonaut who has returned to Earth: it is heavy, but essential. During all my years in the service I do not recall such a great number of sharp discussions, frank conversations, and emotional, uncompromising debates. Everybody wants to receive answers to the most difficult questions which we have inherited from the past and which are arising today. We see this as graphic signs of feedback and of the steadily growing activeness of public opinion, without which there can be no glasnost.

The processes of democratization and glasnost are picking up momentum in our military collective. People are coming out of their social apathy, indifference, and inertia. The volunteer oversight posts, the council of young officers, the certification board, and the women's council have been displaying greater initiative and working more actively.

We see our task as helping people understand the great many new and complicated things which have entered our lives, and helping people become more actively involved in the process of perestroika. We rely strongly on our body of activists in this. These well-trained, competent individuals include officers Alimov, Gorodnov, Saranchenkov, Dyakonov, and others.

Has it become easier to work under the new conditions? Of course not, for we have not been given the luxury of time to master the art of glasnost—we must restructure as we go. But there is no other alternative. And the main thing is for words not to be at variance with deeds. Here is some confirmation of this.

We have had many talks with young officers Senior Lieutenant Veremeyenko and Lieutenant Godlevskiy. The fact is that they were faultfinding commanders and imposed unfair punishment. Typically, neither would listen to any advice. They insisted that they were in the right. It turns out that there were reasons for their stand—a desire not to work but merely to obtain benefit for themselves, regardless of the interests of the collective. The affair ended with gross violations of military discipline and failure to report for duty. Fairly weighty arguments for parting company with these officers. They have been discharged from the Armed Forces.

This of course is an extreme, exceptional case. But let us ask a straightforward question: are all of our people prepared today for a critical analysis and are they capable of listening not only to themselves but to others as well, to consider the interests of their debate opponents, and to make intelligent compromises? All this demands a high level of political indoctrination, awareness, and competence in performance of one's duties. Many people are not yet ready for this. And it is not their fault, but rather our misfortune—a result of the absence of glasnost in the past. Formerly everybody remained silent and complied with any and all decisions. But today the floodgates are open—one is free to debate. We might as well admit it: there are still people who seek to utilize this situation in the interests of their own attitude of total dependence on others. Sometimes they stop at nothing.

[Sterkhov] I am firmly convinced that only that person who has become fully aware of the objectives and tasks of revolutionary renewal of society can become an active, conscientious campaigner for perestroika. Intuition alone, only a sense of good and justice cannot accomplish much. Today it is not enough to realize that there is no alternative to perestroika. Resoluteness is needed, as well as the ability to stand up to those who say: "Are we not going a bit off course?" and "Will democratization and glasnost not undermine the foundations of one-man command?"

We must frankly admit that it is very difficult today, even for truly experienced, innovative ideological activists, to present their point of view exhaustively and in a well-reasoned manner, and to persuade others in heated debate. And what about novice volunteer propagandists? It is no exaggeration to state that literally each new day brings us a flood of information. Under conditions of glasnost the press, radio and television have become a forum for presenting the most diversified points of view on our history and present stage of development. Regimental affairs also demand attention. It is no easy task to absorb this flood of information, arguments, and conclusions. And yet in addition one must formulate one's own position on various issues and be an active implementer of party policy. If to this we add a workday which is filled to the brim, the problems of the propagandist become obvious. At times we simply are physically unable to step

up our activities and genuinely address the matter of increasing our knowledge and improving our mastery of the art of public speaking. What is the solution?

In my opinion it would be highly beneficial to concentrate the most important, current materials in a single location, that is, establishment of a unique "data bank" on the most vitally important problems of our country's economic and sociopolitical development and the processes of democratization and glasnost in the military. In my opinion such information reference centers and associated briefing facilities should be established in military units, where interested parties could obtain answers to major issues of perestroika. And it would be easy to organize such facilities. It would suffice for the party organization to give permanent assignments to one or several party members: regularly to handle updating of theoretical materials and to provide military personnel with the needed literature. This will help raise the level of ideological and political indoctrination work, will strengthen the competence of propagandists, and will create better conditions for self-improvement of Air Forces personnel. The main thing is not to make this a lip-service activity.

[Afanasyev] The ripples of glasnost are expanding ever wider and further.... But the ideology of renewal, in which I have confidence, takes hold not only through the erudition and eloquence of the lecturer or propagandist but primarily through the actual deeds and specific contribution to perestroika by each of us. If a person can openly present his thoughts on any serious problem, if he can learn the truth on any question, this is inevitably reflected in his thinking, in his way of life, in his performance of duty, and even in the quality of the maintenance work he performs, if he works in a technical maintenance unit, in the completeness and reliability of preparation of a combat aircraft to go up, if he is serving in an Air Forces squadron.

Glasnost is an effective tool for eliminating stagnation phenomena. I shall cite an example which, to be honest, is unpleasant to recall. In the past there were frequent instances of violation of military and process discipline in the regimental technical maintenance unit. For example, personnel might not show up for assembly.... From here it is a short journey to misfortune: bitter aviation experience teaches us that fatal accidents begin with minor violations. We of course could not accept such a situation. But neither severe punishment nor other measures produced the required results. At that point we decided to appeal directly to the military community. An open party meeting was held in the technical maintenance unit, at which issues of perestroika and glasnost were discussed. It was a tempestuous, emotional meeting. Party members spoke frankly about deficiencies in their work performance and suggested measures to eliminate losses of work time. Frank words were spoken about the technical maintenance unit chief, and adverse comment was directed at me as well. But the fact is that criticism is the best teacher.

This frank party discussion produced results. The situation in the technical maintenance unit began to change for the better. Evidently everybody was fed up with the mismanagement, confusion and disarray. The new technical maintenance unit chief, Major Kikin, did a great deal of work to unify the collective. The men set about enthusiastically with the task of putting things in order. They worked with inspiration and enthusiasm. Exemplary order was instituted in the technical maintenance unit area, they cleared a site for collecting scrap metal, they built with their own resources and manpower work bays, a fixed-site engine testing laboratory, and they reequipped the dispatcher's office.

Qualitative changes also appeared in organization and performance of routine inspection, servicing and maintenance. They succeeded in somewhat shortening the time required for performing maintenance procedures, without diminishing performance quality. And all this became possible by giving the men greater independence, encouraging airman initiative, and instilling in them the sense of being master at their work station, which in my opinion is an integral part of the processes of democratization and glasnost.

Under the new conditions, when the collective takes a great deal on itself, it is unquestionably easier for the command element as well. Take personnel matters, for example. In the past they were handled behind closed doors: the commanding officer would confer with his deputies if he felt it necessary, and an officer's fate would be settled. Unfair treatment was not rare. Now personnel matters in our regiment are handled by the party organization and the certification board. I should note that practically no mistakes are being made now. The very best men are promoted. Recently, for example, we recommended regimental engineer for aircraft equipment Major Isayev for a teaching assignment. Following a review by the certification board his candidacy was unanimously approved. And this of course is the fair way to do it. During his 10 years of service with the regiment this officer proved himself to be a skilled methods specialist, a conscientious teacher, and a high-principled Communist. His wealth of experience will bring great benefit to his future students. On the other hand the board's activities do a good job of blocking the practice of favoritism and promotion of inadequately-prepared officers to higher positions. In one instance the certification board rejected two submitted candidacies.

This is how glasnost is working. I am an optimist, and I believe that statements by skeptics—why argue and get everybody all upset? they say; you can't change anything anyway—are being inexorably eroded away by such facts, by the activeness of people who have grasped and accepted the meaning of perestroika. The time is past for those who are skilled at conducting affairs in secret. The time has come when glasnost is the best assistance in military labor and service.

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Vignettes of Combat in Afghanistan
91440095f Moscow AVIATSIYA I KOSMONAVTIKA
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5 Aug 88) pp 16-17

[Article, published under the heading "We Are Internationalists," by Lt Col G. Drugoveyko: "34th Parallel and South...."; part one of two-part article]

[Text] I was at a Moscow airport late one night in March. Boarding of the big passenger jet would soon begin. There was a large crowd of passengers in the departure gate area. My journalistic trip to Afghanistan was about to begin.

I had the feeling that everything was filled with some special meaning. I looked for some kind of recognition of this in the faces of my fellow passengers. I could detect nothing unusual. Everything was normal here, because the war was there.

The Crew

We talked not only about the war. As far as we were concerned, all subjects and questions were appropriate. The only thing inappropriate here was phoniness. It is forbidden by the situation and by the very life here at this latitude.

They were introduced to me in the following order: aircraft commander Capt Oleg Zavgorodniy; copilot Sr Lt Vladimir Sidorchuk; navigator Capt Sergey Litkevich; flight technician [crew chief] Capt Vladimir Vasenin; and aerial gunner WO Nikolay Zagnoyko.

They had been serving in the same unit, but on different aircrews. They had submitted requests for reassignment to duty in Afghanistan in May 1987, without consulting one another and without knowing that the others had made the same decision. They began to look each other over when it was determined that down there in the war zone they would make up a single crew and share a common fate. They all liked one another.

Their first flight together as a crew took place on 13 October 1987, from Kabul to Jalalabad. As they were taking off at Jalalabad, they came under fire. A dushman [Afghan rebel] machinegun was firing at them from a Toyota pickup. The incident lasted only a few seconds. All of them had a similar impression: confusion. The main thing, however, was the fact that each had complete confidence in his ability to fly. There is a great deal down here that is different. There is the somewhat sinister beauty of the mountains, and there is the constant expectation of danger.

...Once they returned from a flight with combat damage: one wheel had taken a hit. They could feel it as they touched down. They had a few very difficult seconds,

incredibly compressed in time, but they successfully handled the problem. Each crew member contributed his share of the struggle to preserve the life of the aircraft and its crew...

Sometimes they hauled captured prisoners. The crew gazed with curiosity at people who a week ago, the day before, or perhaps just an hour ago may have taken aim at their "Anton-dvadsat shestoy" [Antonov An-26].... The rebels varied in appearance. There were those who were strong and healthy, confident and undaunted by their capture. There were those who were totally demoralized, crushed, and there were some who appeared emotionally numb and deadened. There were also some who were indifferent to everything.

Several weeks later a difficult period commenced. It somehow happened that they had three combat losses one after the other. In military transport aviation this means a great many close friends all at once.

In war there is one cure-all medicine—hard work. And flight operations statistics confirm that this crew was given plenty of work. More than 300 flights in combat conditions. Sometimes as many as 10 landings in a 24-hour period. And every landing, even if it is not made under fire, is a special, "Afghan" landing approach. These steep, spiraling approaches are difficult even for fighters, but the An-26 is a cargo aircraft.

They sometimes transported the bodies of soldiers killed in action. None of the crew members was able to talk about these flights. They all fell silent at once.

They were all eager to talk about the airmobile assault troopers: "Those guys are real he-men...."

"They have this special calm dignity...."

"You don't get a single groan from the wounded. They keep everything deep inside. They help one another. They are shy about asking for anything...."

"We have great respect for these soldiers. A really sharp contrast: 19 or 20 years old, and yet they have the sedateness of the elderly...."

They spoke warmly about their squadron commander, Lt Col Viktor Poluektov. They said with pride: "On one occasion, while under fire, he landed, took wounded aboard, and took off. And the entire procedure took only 5 minutes."

"In short, he is a real man. He carries responsibility for the entire squadron, for combat operations and for us...."

This crew had the following experience. The aerial gunner-radio operator had begun a situation report. Before he had uttered two words.... It was obvious what

was happening by his tone of voice. Hands instantly went for the most important button in this situation. They reached it in time. The Stinger passed by harmlessly....

The aircraft commander is perhaps by nature calmness embodied. But.... Everybody is talking, interrupting one another. But if the pilot utters a single word, they pay absolute attention. The pilot is number one. Everywhere. On the ground as well. He is not older than the other crew members. He is the skipper. If I were in combat I would want to have such a commander. And yet he is almost young enough to be my son. But this man, of quite ordinary, unheroic stature and appearance—has a year and a half of war behind him.

Simple Truths

Down here you grasp two simple truths immediately. The first truth: combat operations naturally are facts. Facts of enormous content and significance. Facts commensurable with life itself. And the second truth is that air crewmen who work under fire acknowledge you, no matter who you might be (political worker, commander, journalist), only when they are confident of your personal readiness to go into combat.

The aircraft commander and I were discussing what kind of mission it would be best for me to go along on. I needed a mission which was intensely packed both with tactics and psychology....

We chose outpost resupply flights. Everything would seem to be focused in such missions.

Every job here is done with thoroughness. For this reason they assigned a veteran line officer to me, who briefed me in detail on the manner, procedure and sequence of performance of this mission and, of course, my actions in all conceivable and inconceivable situations. The aircraft would be carrying no passengers on such a flight. Each individual must know his own responses and his linkage with the actions of all crew members.

But nature is capricious. We did not make the flight. Up to the very end of my visit aircraft were grounded by weather. The bad weather also confined the dushman to caves and field shelters.

But here is an interesting point. Everybody at the airbase learned of my preparations to go out on a mission. And a reporter's very willingness to fly broke down all barriers. They treated me as one of their own, as an equal.

I still feel anger at the weather and the circumstances, because I did not go up, because I did not share that common stress and tension for even a few hours.

The Poet and His Songs

I knew that I would meet him. I did not know that his name would be Vladimir Kolesnik and that he would be a helicopter gunship pilot. I knew nothing other than that he was a poet.

My military service and life experience long ago convinced me that courageous people are always sincere and open. Afghanistan demanded courage.

I got together with Vladimir on numerous occasions.

His crew was called upon to fly all kinds of combat missions. Extraction of wounded from the battlefield is a difficult task. You are constantly under hostile fire. Conditions are always difficult: topography, weather, time of day. And of course there is that special fury of the rebels, aroused by battle and by blood. And just what does the enemy's fury in battle mean? It means ten times the volume of fire from everything that can be fired or thrown.

Outpost resupply missions are also difficult. The dushman are well familiar with these inaccessible, isolated positions. The only force against the handful of officers and men is that very isolation. They cannot be driven out of their positions. But they also cannot leave their fortified mountaintops. Not for medical assistance, not for fuel, and not for water. The enemy is aware of this, and waits....

Captain Kolesnikov's first combat mission involved escorting troop-lift helicopters extracting wounded.

The escort element was supposed to force the rebels to engage the gunships. But how could they accomplish this? By creating a situation in which the "spooks" [Afghan rebels] could do nothing else but engage the escort gunships.

"Even if you are stealing Allah out from under their noses, saving their own skin still means more," Vladimir described the optimal tactical situation, which had to be forced upon the enemy. He added: "This escort mission was my first and greatest pride. Pride in the fact that I am an officer, that I am a helicopter pilot, and that I came under fire for the sake of my comrades."

Words can hardly describe it all better than the songs written by Vladimir....

How do you test faithfulness to the dream of youth? Here is how: on a combat mission.

Deadening our sense of fear, We go on, to carry out our duty with honor. At one time—the call of our youth. Now—we can prove it.

Military comradeship.... Down here it is not only an ethical category but also a principle of conduct of combat operations.

Incidentally, the "defenders of the faith" fight differently: each man for himself.

The situation dictates its own laws. The rebels lead primarily a nocturnal life. Our pilots were not fighting an air war in Afghanistan. They were limited to the tactics of the most essential response actions. Afghanistan required night flying. The airfields were busy from dusk to dawn.

A unique brotherhood in arms is forming out there, far from the homeland. But this is happening not only due to kinship of nations. True brotherhood is the result of the fact that our fighting men are in debt to one another. Somebody saved somebody else's skin. It is for this reason that the "Afghans" have high regard for comradeship in arms.

I once dropped in for a visit with Vladimir in his "module." I was struck by the room, in which male hands reigned. Not by its spick-and-span appearance, although I must admit that it was indeed spotlessly clean. I was surprised by the human warmth of the place.

Each person had his own "icon corner," displaying photographs of their loved ones, that is, mother, father, wife, sons and daughters, and friends. Children's drawings. Most of them bore greetings. One of them portrayed a Stinger chopped in two by a leafy twig, with the inscription: "Miss!" Another drawing showed a helicopter with mountains all around. The inscription was not very diplomatic: "All dushman are bad!"

...We probably at times admire the manner and skill with which some Western leaders give an interview or conduct a dialogue. As I listened to Vladimir's songs I thought to myself that there is nothing more wrong than to judge people by their manners. Manners are theater. Decisions and actions are a person's actual life and value. What is the value of these magnificent, sparkling, toothy smiles? Behind them lurk not only Stingers. Behind them lies an entire war in Afghanistan. The blood of Afghans, and our blood as well.

We talked a great deal about combat. Strange as it seems, however, for some reason man kept pressing past tactics into the foreground. Friend or foe, but man nonetheless.

Discussing one of his combat experiences, in which Kolesnik's crew was almost brought down because of a second's delay, Vladimir stated his soldier's credo: "Although I am a military pilot, I am a man of peace. I will not fire unless I am absolutely sure that I am facing an armed enemy...."

At that point I decided to attend another mission briefing. (To be concluded)

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Changes Proposed in Student Pilot Study of Aerodynamics

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[Article, published under the heading "The Reader Suggests," by Military Instructor Pilot 1st Class Lt Col N. Litvinchuk, candidate of technical sciences and docent: "How Should Theory of Stability and Controllability Be Studied?"]

[Text] Modern combat aircraft possess considerable maneuver potential. But practical realization of this potential depends on the aircraft's handling and performance characteristics. Knowledge and awareness of these characteristics, including stability and controllability, enable a pilot to utilize them safely and most fully when maneuvering.

Stability and controllability of an aircraft in flight are the most important things for a pilot from a practical standpoint, but at the same time theory of stability and controllability is the most highly complex as regards formal study. There are several reasons for this, and they are all interrelated.

One of them is purely psychological in nature. Frequently a young pilot who is mastering theory of flight, when he first encounters difficulties in studying stability and controllability, loses faith that he will be able fully to master these elements of the course on dynamics of flight. This attitude is also fostered by the fact that the handling and performance characteristics of aircraft are good within the range of altitudes, airspeeds, and load factors in which he is operating and do not require special knowledge to assimilate, plus a view which is encountered among flight personnel that all required knowledge is learned only in the air. As a result a pilot finds himself in a very difficult situation when he unexpectedly encounters in the air an imbalance or out-of-trim situation or unusual change in stability and controllability characteristics.

It seems to me that the main reason for this situation lies in the structure of the course on aircraft stability and controllability taught at flight schools. For example, in order to have a solid grasp of these matters, a pilot should have a clear picture of at least 20 different kinds of stability, controllability, trim and balance and a large number of static and dynamic moments acting on an aircraft in flight, separately and in combination.

Figure 1 shows the existing structure of the study of flight dynamic by pilot cadets. In spite of the fact that it covers the most important items, a mere listing of these items, even without further discussion, indicates the complexity of the subject. Lack of a clear-cut logical interrelationship and analogy between them and the

Figure 1. Structure of the Subject Area of Aircraft Stability and Controllability Studied by Flight School Pilot Cadets

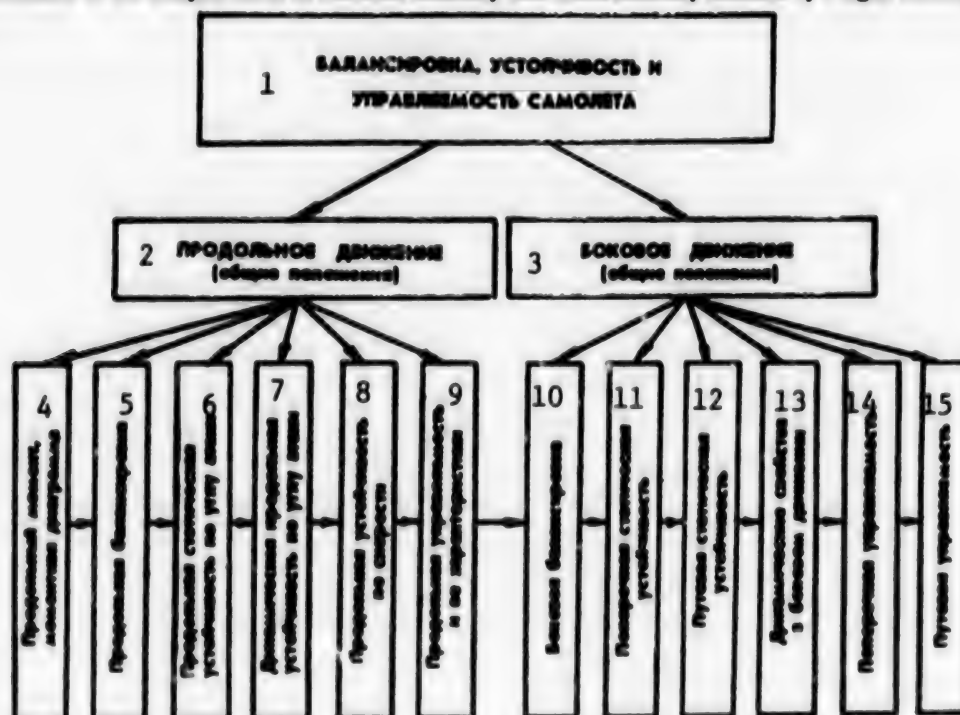


Рис. 1. Структура раздела устойчивости и управляемости самолета, изучаемого курсантами летных училищ.

Key:

1. Aircraft trim and balance, stability, and controllability
2. Longitudinal motion (general considerations)
3. Lateral motion (general considerations)
4. Pitching moment, vector diagram
5. Pitch trim
6. Angle-of-attack longitudinal static stability
7. Angle-of-attack longitudinal dynamic stability
8. Airspeed longitudinal stability

9. Longitudinal controllability and its characteristics
10. Lateral trim
11. Lateral static stability
12. Directional static stability
13. Dynamic properties in lateral motion
14. Lateral controllability
15. Directional controllability

diversity of characteristics makes understanding extremely difficult, and therefore makes thorough study and memorization extremely difficult as well.

As we know, theory of stability and controllability were originally developed in aircraft engineering to meet the needs of designing aircraft and subsequently became the object of specialized research. Its main task is to result in the design of a well-handling aircraft. An additional task is to provide pilots with recommendations on considering peculiarities in aircraft handling and control in the air, as well as in the case of aircraft malfunctions.

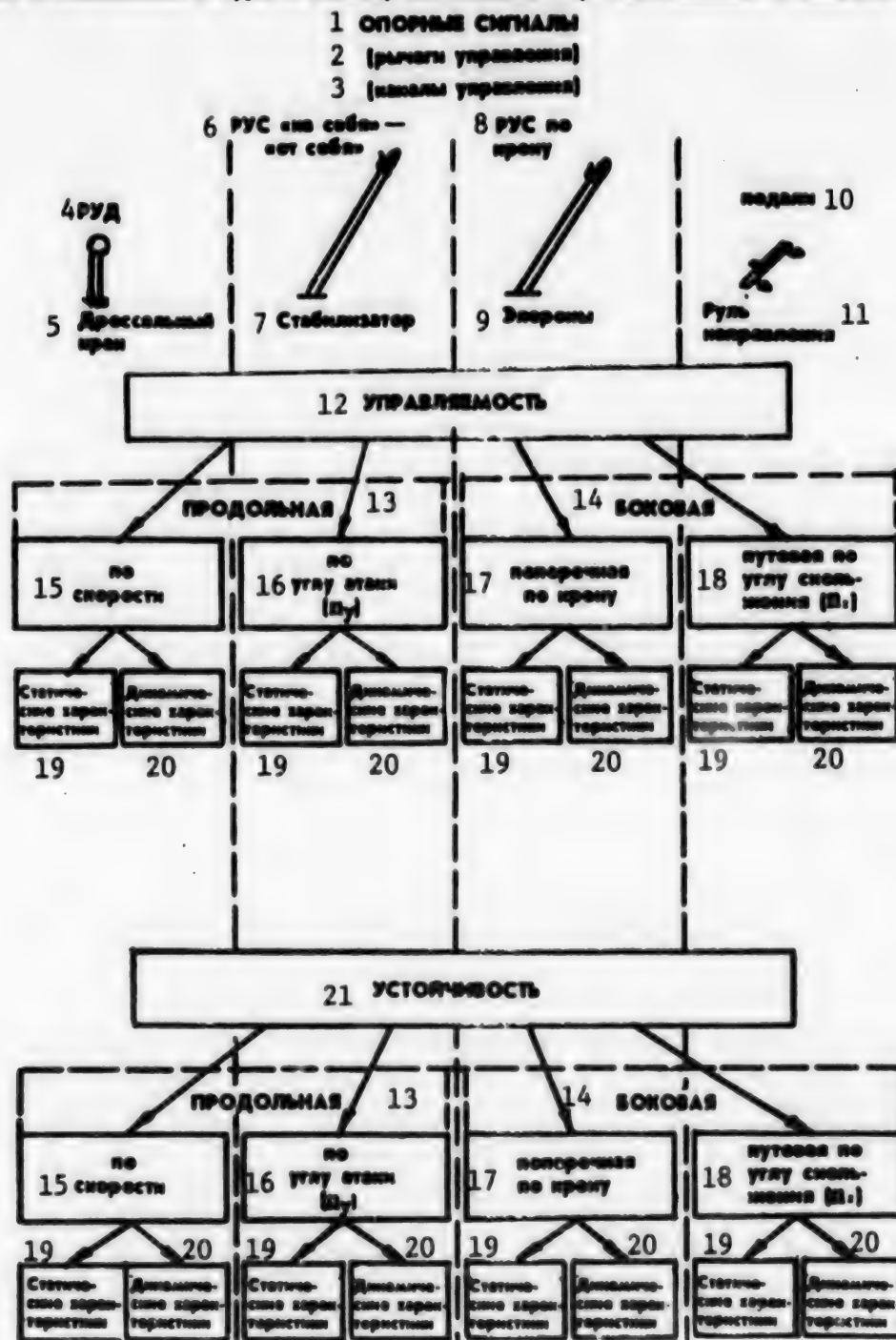
However, the course as laid out gives little consideration to the tasks and specific features of flight training and the level of knowledge of the students. For example, they try to give a flight school first-year cadet, who is just out of high school, the same material and in the same structure as a student enrolled in the military air engineering academy. Naturally this approach results in considerable difficulties for the student.

Flight personnel need knowledge in this area of dynamics of flight in a more easily-assimilated, practical form, taking into account the specific features of the design and construction of the aircraft being studied, for in order to fly successfully a pilot needs to know a great deal of additional important information. Practical experience in study of theory and flight training indicates that this problem is successfully resolved by applying the well-known principle of reference signals, but taking into account the specific features of flying.

First, as is customary, general considerations of stability and controllability are examined: the various types of aircraft motion are studied, the frame of axes, moments acting on an aircraft, their coefficients, the concept of equilibrium, trim and balance, stability and controllability, etc, after which a classification of these items is presented.

The main points of this approach are presented in Figure 2. Reference objects of importance to the pilot are

Figure 2. Classification of Types of Stability and Controllability With Utilization of Reference Signals



Key:

- | | | |
|--|---|-----------------------------|
| 1. Reference signals | 8. Control stick (column, yoke), lateral motion | 14. Lateral |
| 2. (control sticks/levers) | 9. Ailerons | 15. Airspeed |
| 3. (control channels) | 10. Rudder pedals | 16. Angle of attack |
| 4. Throttle or thrust lever | 11. Rudder | 17. Roll |
| 5. Throttle valve | 12. Controllability | 18. Directional, yaw |
| 6. Control stick (column, yoke), fore-and-aft motion | 13. Longitudinal | 19. Static characteristics |
| 7. Stabilizer | | 20. Dynamic characteristics |
| | | 21. Stability |

sticks or levers, which are linked to the corresponding control elements and form airspeed, angle of attack (normal load factor), yaw angle (lateral load factor), and roll control channels. As a result we have four main types of controllability.

From the standpoint of the pilot, aircraft stability can be defined as an aircraft's ability independently to maintain flight parameters specified by the pilot with the aid of the controls, that is, those parameters which the pilot directly controls. On analogy with controllability, one can easily remember that there are four basic types of stability: airspeed, angle of attack (normal load factor), roll (lateral load factor), and directional stability or yaw stability. Stability and controllability are subdivided by type of aircraft motion into longitudinal and lateral and possess static and dynamic characteristics. In current theory these types of stability and controllability are called static and dynamic stability and controllability respectively. If no basic changes are made, the number of types for the pilot to learn is doubled, which makes the learning process more difficult.

Static controllability characteristics determine required displacement of controls or change in forces on controls to change a parameter by one unit, as well as to change parameters with maximum deflection of the controls.

Dynamic control characteristics determine the nature of the transient process from one steady-state parameter to a new trim or balance parameter with gradual control displacement. These characteristics include response time, parameter overshoot, and other parameters governed by appropriate documents.

The static characteristic of stability determines an aircraft's tendency independently to return to pilot-set conditions following cessation of small disturbances, the presence of a stabilizing moment, and its magnitude. These characteristics include derivatives of coefficients of stabilizing moments (rotational effect directed toward stabilization) and their relationship with various factors.

Dynamic stability characteristics determine the transient process as the aircraft returns to the desired parameter and include period of oscillations, frequency, number of oscillations, and time to full attenuation of oscillations, etc.

Essentially analogous characteristics are selected for each type of stability and controllability respectively. Practical experience has shown that in this instance it is sufficient for the pilot cadet to master the characteristics only of one type of stability and controllability in order easily to understand by analogy other types and characteristics as well.

After this the student studies lateral stability and controllability, which constitutes the combined manifestation of these aircraft properties directionally and laterally. Period and frequency of lateral oscillations, number of oscillations, and time to full attenuation, as well as the

kappa coefficient, etc are taken as dynamic characteristics of this type of stability. Applied to controllability, most frequently its static characteristics are examined—required control deflections and control forces for slip-configuration straight-line flight.

Following review and assimilation of the general points of theory of stability and controllability, that is, after the pilot cadet acquires basic knowledge, this subject is examined in greater detail, with a focus on practical application. In this instance he studies additional moments: damping, exciting, etc, and the effect of various operational factors on these moments: the existence of dampers, automatic stabilizing units, external stores, remaining fuel, as well as the occurrence of various abnormal situations. At the same time he studies the effect of these moments on stability and controllability characteristics and required pilot actions.

At the present time equal emphasis is given to study of aircraft trim and balance as to stability and controllability, and sometimes primary emphasis is placed on trim and balance. For example, airspeed stability is judged from trim curves. In the proposed variation trim and balance should be presented as a particular instance of aircraft control pertaining to keeping one flight parameter constant, and trim characteristics would be control deflections and control forces required to maintain trim, that is, trim diagrams.

In conclusion we should stress that this article does not question the correctness of current theory of aircraft stability and controllability. What we are proposing is a certain change in its structure and method of teaching flight personnel, in order to make it more easily understandable to the pilot and in order to bring theory as close as possible to practice. This will help improve pilot air proficiency and consequently will help improve flight safety.

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Using Scientific Analysis in Devising Air Defense Penetration Tactics

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[Article, published under the heading "Into the Military Airman's Arsenal," by Candidate of Military Sciences Docent Col V. Gryaznykh: "Innovativeness... Without Secrets or Sudden Inspirations"]

[Text] Flight over enemy territory always is a confrontation and contest with the enemy's air defense. Each side will endeavor to create for itself conditions in which its combat capabilities are fully realized and with maximum effect, while the adversary's strong points are reduced to a minimum.

But the purpose of one-on-one combat, with its directly opposing objectives, is for one contestant to emerge the victor. And as a rule he who is more skilled in tactics emerges victorious. He is better at foreseeing, predicts more accurately, makes a decision faster, determines the best move, expertly executes a combat tactic, seizes the initiative and imposes his will, and creates from conditions which would seem to be not under his control conditions which are advantageous to him.

All this is also combat pilot tactical innovation. So to speak, the "court of final instance"—combat. The final instance, for there is a first, a second, and a third... stage of professional tactical innovation. In combat it is impulse, improvisation, surge of imagination. Prior to combat it is the accumulation of combat potential, building and continuous modification of the arsenal of the military specialist. Let us try, freeing innovation from the glow of a mysterious aura, to analyze its rough-draft working-level domains, stages and phases.

One can probably isolate three domains of tactical innovation with a certain degree of arbitrariness, directed toward combating the air defense assets of the potential adversary: research, study, and practical application.

I shall very briefly address the domain of research. New air defense assets, including those which are still in the process of development, are the object of our interest. Our method is analysis of the operation of an anti-aircraft missile system about which we do not have precise information, and development of a mathematical model of this SAM system. Objective: determination of the probable indices of combat employment, and preliminary determination of its strong and weak points. Practical results: elimination of total uncertainty in respect to the parameters and process of operation of the "unfamiliar" system.

In the course of our research we search for fundamental (basic) tactical ideas for defeating the system in question and establish correspondences between the parameters of tactics, the conditions of their employment, and the degree of diminished system effectiveness. Determined tactics are grouped as a rule by criterion of influence on the effectiveness of defeating the hostile weapon system in question. The research phase concludes with drawing up practical recommendations on reasonable tactics for standard tactical situations.

This is a beginning, a first approach to a new weapon which combat pilots could possibly encounter in a combat situation. On the other hand this is merely a foundation, a point of departure in the tactical innovation of military pilots.

In the domain of study, problems of training and preparing for combat operations are resolved which are unique to this domain. This process consists essentially in the following: thorough study of the adversary's

weapon system, profound analysis of tactics of combating this air defense asset both as an independent installation and within the system of other air defense combat assets and, finally, formation and reinforcement of the requisite skills in performing simple calculations and situation assessment methods, as well as prediction of the course of development of combat situations and rapid adoption of a thoroughly substantiated decision by a commander in the most difficult conditions.

The domain of study can become genuinely innovative if professional training motivations are skillfully formed. The formulation of tactical problem situations is a good motivation for innovative effort.

The main thing in a problems approach to training is to create a nonunique multiple-variation problem which will require comprehensive analytical work, assumes different solutions, and which leaves open a possibility of comparing and assessing them in a valid manner, accurately and substantively, rather than a speculative comparison.

One must see and persistently follow the objective of this domain of tactical innovation. It is as follows: reduction to a minimum of a process of readying for a combat sortie by using the experience and know-how amassed during training. One can also state it more definitely: to prepare the combat pilot's intuition for combat.

Intuition in a pilot's thinking is not a supernatural sudden inspiration but instantaneous reaction by the brain to a familiar situation. A reaction the groundwork for which was laid down by preceding hard training effort, when all possible tactical situations were analyzed and evaluated, a search for rational and reasonable actions promising success was conducted, and skills in executing a large number of primary tactics, a combination of which is developed into a complex combat action, have been developed and rehearsed to a state of automatism.

The practical domain comprises a tactical inquiry seeking application of knowledge and skills for the conduct of effective combat against hostile air defense forces and assets. It is also expedient to subdivide combat tactics into several groups in accordance with a decision hierarchy.

For example, the first group contains tactics the employment of which is planned by the unit or subunit commander. These include selection of reasonable routes, flight profiles and configurations, modes of forming, changing formation and maintaining formation, as well as special maneuvering for the purpose of deceiving the adversary about our actual plan of action.

The second group contains tactics selection of which is made by the commander flying directly in the subunit or unit formation. This selection is based on information

on the adversary which is communicated to the commander's aircraft when airborne. In content this group contains various maneuvers to bypass the impact zones of air defense weapons detected while en route on the mission.

Finally, the third group includes tactics employed by aircrews (tactical units) in weapons delivery zones. Onboard systems and visual observation become the sources of information for selection of the proper action.

This group of tactics essentially consists of missile-evasion, antiaircraft fire evasion, and fighter-evasion maneuvers in combination with various amplifications of combat maneuvering effect (abrupt change in flight configurations, employment of ECM, and defensive fire by the aircraft).

Selection of specific parameters of tactics in the first group is made following analysis of combat mission simulation results. It is essential to estimate the effectiveness of penetration of hostile air defense on the basis of different action variations. It is also very important to consider those mission support measures planned by the higher echelon. And it is essential to coordinate tactics of this group with possibilities of carrying out subsequent tactical actions.

Obviously a computer is indispensable in order to perform a rapid evaluation of all possible alternative variations and to shorten the time required to reach a decision with a high degree of optimality.

When preparing to employ tactics in the second and third group, phase-by-phase simulation of the forthcoming mission is necessary. The basic work method is prediction of possible tactical situations in air defense weapons countermeasures sectors and the search for reasonable response to each of them. Of course computer classrooms and tactical simulators are needed for proper training and preparation. These will make it possible not only to reproduce combat situations but also to rehearse in detail actions in a combat environment.

Elimination or validated consideration of uncertainty in the adversary's actions and a multiple-variation nature of rational tactics constitutes a most important methodological issue of tactical innovation (especially in the domain of practical application). The principles of so-called "reflection game" and employment of the method of sequentially increasing the complexity of tactics and modes of action when planning air defense penetration can become very useful in this regard. Their gradation by degree of complexity is quite extensive: from situations lying at the surface and consequently obvious, to situations which take the adversary entirely by surprise, from passive evasive action to aggressive offensive combat with the aim of total annihilation of the opposing air defense asset.

The principles of the "reflection game" consist essentially in sequentially ascending through "levels of reflection" and in seeking ways to achieve success in combat with an increasingly sophisticated and wily adversary.

Here is an example of development of this game:

"I know the capabilities of my equipment and I plan to use its strong points." (Zero reflection level)

"I know the capabilities of the adversary's air defense assets and views on their combat employment. Consequently I can describe his actions. Taking this and my own combat capabilities into account, I shall construct a rational air defense penetration tactic." (First reflection level)

"I am assuming that the adversary knows the capabilities of our equipment and can determine a rational first-level variation of actions (intelligence, simulation of our side, or both simultaneously). Therefore I shall take this circumstance into account and adjust my actions." (Second reflection level)

And so on.

As a result we gradually ascertain the most stable tactics and modes of action as well as less stable ones, that is, ones which are valid only for a narrow range of combat situation conditions. Objective knowledge of stable and unstable tactical variations as well as skillful utilization of these variations in planning and directly in combat will ensure successful accomplishment of a combat mission with minimal losses.

All outstanding field generals and gifted military leaders have been able to rise at least one level higher than their adversary in predicting future events. A. Chakovskiy writes in his novel "Blokada" [Blockade]: "G. K. Zhukov, glancing at a map, did not simply recreate a picture of a forthcoming battle. He had the ability to foresee the nature of a future battle, to 'run through' different variations, as it were, within the span of minutes, at first for friendly forces, and subsequently for hostile forces. He had the ability temporarily to abstract himself and reembody himself into his adversary, in order subsequently, returning back to himself, to assess the enemy's intentions."

Success in combat against hostile air defenses is laid down in the course of tactical innovative inquiry—on the ground and in the air. Knowledge of the adversary, his air defense assets, a keen understanding of the physical processes of functioning of one's own and the enemy's combat equipment, a large array of reasonable tactics applicable to appropriate situations, and the skill of rapid situation analysis and precise prediction of the

actions of the opposing force—all these are not only components of a high degree of combat skill but also constitute the scale of innovative potential of the combat pilot, and consequently a source of courage and daring, and a way to achieve victory over the enemy.

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Devising Air Tactics By Simulation Techniques
91440095i Moscow AVIATSIYA I KOSMONAVTIKA in
Russian No 9, Sep 88 (signed to press
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[Diagram: "Tactics: Constructing a Combat Model"]

[Text]

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Training Pilots To Be Prepared For In-Flight Emergencies

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[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Military Pilot 1st Class Maj V. Prudnik: "Preparedness for the Unexpected"]

[Text] At the very height of the action during a tactical air exercise the flight commanded by Military Pilot 1st Class Maj L. Fokin was given the mission to destroy mobile "aggressor" ground targets. The aircrews, quickly proceeding to their aircraft, taxied to the active one after the other. Sr Lt N. Petrukhin was supposed to be the last to take off. Taxiing into position, he made only a cursory cockpit check and radioed ready for takeoff. Cleared by the tower, he released his brake and firewalled the throttle. The aircraft proceeded to roll. He was forced to abort takeoff, however, when the afterburner failed to respond.

The aircraft returned to the ramp, and ground personnel immediately proceeded to try to locate the problem. Many of them assumed that it had been an equipment malfunction, but analysis indicated that the pilot was to blame for the fact that he was unable to light the afterburner. In his haste Sr Lt N. Petrukhin failed to check the position of the switches and failed to notice that the maximum afterburner circuit breaker switch was in the open circuit position. One can imagine the difficult situation into which Petrukhin would have put his comrades if this had happened in actual combat.

The mishap-threatening situation was analyzed in the squadron with all flight personnel. Many of the men noted with concern that recently there had been a tendency in the subunit toward a careless attitude toward aircraft cockpit practice drills. And yet pilots should practice cockpit procedures until they reach a state of conscious automatism.

Unfortunately such incidents are not isolated in combat training. It was noted that mistakes are encountered most frequently where there is a lip-service attitude toward moral-psychological and simulator training of aircrew personnel and where they fail to consider the fact that an in-flight emergency situation can arise at any time. The fact is that at the present time we do not have available effective diagnostic equipment capable of determining with a high degree of accuracy the state of working order of aircraft systems and equipment and of predicting equipment failure. This means that nobody is guaranteed against the unexpected. As a result a pilot's ability to perform correctly in an emergency situation on the basis of the prescribed operating procedures is always of considerable value.

As practical experience indicates, poor knowledge of symptoms of potential malfunctions and ways to prevent and neutralize them can lead to irreparable consequences. On the other hand, psychological preparedness for the most adverse in-flight situations and aware professional automatism of response not only make it possible quickly to reach an intelligent decision but also promptly to carry it out.

In connection with this I recall an incident which occurred several years ago involving Military Pilot 1st Class Maj A. Toporkov. During takeoff a bird was ingested into his engine. The aircraft had not gained much altitude. It seemed that ejection was the pilot's only option. Obviously if Aleksandr Vladimirovich had been inadequately prepared both psychologically and professionally, this is precisely what he would have done. And perhaps he would have been unsuccessful. But Toporkov displays excellent control and composure.

Within seconds Aleksandr Vladimirovich had assessed the situation and reached the only correct decision, which saved both his life and his expensive combat aircraft. I believe that at this moment it was primarily proficiency gained through drill and practice which formed the basis of this pilot's precise, correct actions. Perhaps it was precisely this which helped him immediately to reproduce in his memory the requirements of the appropriate emergency procedure and to execute it promptly and efficiently.

Psychologists claim that the search for a rapid, precise solution to a problem which has arisen is one of the main areas of human intellectual activity in a complex situation. If one considers the speeds at which we aviators fly one can easily imagine how little time one has to make a decision. Only seconds are available, and sometimes a fraction of a second. Therefore one must be able even on the basis of negligible symptoms to determine in advance the onset of operational malfunction or failure of a given system and to construct a model of the development of events. Of course as a pilot's level of proficiency increases, he accumulates a certain store of knowledge as well as skills in response by the controls to his aircraft's spatial attitude when equipment malfunctions occur. But it would be erroneous to assume that this ability comes automatically with time. Confirmation of this is offered by errors by pilots who have served 10, 15, or more years in line units. Sometimes a pilot flies for years without the slightest problem, and then at some moment he proves unable to handle a situation which has arisen during flight. Only that pilot who never rests on his laurels and never stops self-improvement is capable of displaying his best qualities. And yet complacency is a fairly common phenomenon. As paradoxical as it may seem, complacency is brought about by... the operational reliability of one's aircraft. It truly cuts both ways! We sometimes forget that we must be prepared for the unexpected.

Currently pilots are regularly practicing in-flight emergency response procedures in practice drills on specialized equipment and in the aircraft cockpit. Sometimes,

however, the end objective of such a practice drill boils down to merely explaining procedures in case of a given malfunction. I have learned through my own experience that such simplification is only harmful. The main element disappears in a practice drill—the psychological background which accompanies a pilot's actions in an emergency situation. I shall illustrate from my own practical flying experience what this leads to.

Once (I was still a senior lieutenant at the time) I was to fly a strike on ground targets at the range. Prior to that we had rehearsed such a maneuver sequence, and I had received a mark of excellent. Apparently my good performance caused complacency: I felt like a real hotshot pilot. On preliminary preparation day I did not bother much with performing calculations. Taking advantage of the flight commander's absence, I conducted the practice session just going through the motions, as they say.

It is not surprising that I made a number of mistakes at the range. My confidence totally evaporated at that moment. My hands refused to obey, as if they were somebody else's. Incorrectly executing my maneuver, I put the aircraft into a dive at a steep angle. In addition, engrossed with the aiming, I pulled out of the dive excessively low, pulling such a high g load that my vision darkened.

Poor preparation on the ground for the training sortie led to a low mark and a near-mishap situation. But there is another point to make. Subsequently analyzing my actions in a calm setting, I realized that I very easily could have been killed. I must honestly admit that this thought really upset me. I felt burning shame for my personal lack of discipline, not only one-on-one with myself but with my superiors, who bore moral and professional responsibility for me. I never again was guilty of unnecessary relaxation of demands in training.

I have gone into this incident in detail because many young pilots, not yet having adequately mastered their combat aircraft, begin displaying complacency and neglect constant improvement of their professional skills. Perhaps my bitter experience will serve as a warning to them.

I should also like to state that those flight commanders who always make it a point to use ground practice sessions to rehearse their men's responses in various in-flight emergency situations, help them simulate these responses in advance, and provide practice drills with a high level of psychological intensity are doing the right thing. The flight commander is the principal mentor and teacher for his pilots, especially the young pilots. And if he does not concern himself with preparing these lieutenants for emergency situations aloft, no orders or regulations will help solve the problem of flight safety.

Recently I visited a training session in the flight led by Military Pilot 1st Class Capt V. Fedorenko. My attention was immediately drawn to the fact that simulation of an

emergency situation in the course of a practice drill was not an end in itself but an organic component of the flight, as it were. And thanks to the flight commander's precise planning and execution, the emergency situation took the trainee totally by surprise. This helped the pilot accomplish comprehensive assimilation of the entire procedures required in performing the assignment and helped him take the conditions of the assignment into account in an innovative manner, helped him develop the ability to think quickly and efficiently in the air, while not being diverted from the job of flying the aircraft. Captain Fedorenko is well aware that isolated skills lead only to rote drill and to limitedness of thought process, and he makes every effort to avoid this.

Nevertheless, no matter how fruitful a training drill, it fails to give a complete picture of an emergency situation if one considers the meager capabilities of our simulators. For that reason it is necessary to go up in dual trainers for this purpose. This of course costs a tidy sum. But there is no other option: people's lives are more precious than money. But the problem of designing and building effective, modern flight simulator systems must be resolved without delay.

We are also waiting for sensible recommendations in the line units on how better to organize pilot ground training and instruction. Appealing to our military scientists on behalf of my comrades in arms, I would like to state that more than enough dissertations have been written on general problems. We have had enough of this grandiose scale! What we need are practical, specific "minor items," which will help us at the flight and squadron level to increase the effectiveness of the training process and help prevent air mishaps.

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West Accused of Encouraging Soviet Ethnic Nationalists

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[Article, published under the heading "At the Fronts of the Ideological Struggle," by Candidate of Historical Sciences Col Ye. Sergeyev: "Special Form of Aggression"]

[Text] "...Imposition of a social system, way of life, and policy from without—by any means, let alone military—represents a dangerous practice of former years. Sovereignty and independence, equality of rights and noninterference are becoming generally acknowledged standards of international relations...."

From the proceedings of the 19th All-Union CPSU Conference

The immense job of restructuring Soviet society, begun at the April (1985) CPSU Central Committee Plenum and ratified by the 27th CPSU Congress and the 19th All-Union Party Conference, also affects relations among the nationalities. A correct conclusion is articulated in the CPSU Program that the nationalities question, as a product of the past, has been resolved in the Soviet Union. The significance of ethnic factors is not diminishing at the present stage, however. The events in Alma-Ata, the Baltic, Armenia, and Azerbaijan have shown that negative phenomena and distortions against which we have campaigned have also been manifested in the domain of ethnic relations. Localistic tendencies, tendencies toward ethnic introversion, and ethnic conceit are making their presence felt.

The party is aware of the great complexity of this problem and warns that it must be resolved in a tactful manner, that one should approach gingerly, solicitously, and with respect the ethnic interests and feelings of any nation or ethnic group, large or small. The time has come more thoroughly to analyze and to discuss these issues taking into account all that is being brought to our country by perestroika, democratization, and the new stage in its development.

As practical experience shows, nationalistic discontent is possible even in conditions of socialism. But it would be erroneous to believe that it escalates spontaneously into antisocial actions. Here, as in many other areas of our nation's affairs, a necessary ingredient is the intervention of imperialist propaganda and a special form of aggression—subversive radio broadcasts.

As we know, at the present time approximately 40 radio broadcasting operations are beaming broadcasts to our country in 27 different languages of peoples of the USSR, a total of up to 270 broadcasting hours per day. Radio Liberty and Radio Free Europe alone broadcast more than 1,000 hours weekly in 23 languages. The United States and Israel have signed an agreement calling for construction of an additional shortwave transmitter to be located in Israel. After 16 500,000-watt transmitters enter service, the United States is counting on reaching the "heart of the European part of Russia and the Central Asian republics." "The secret war against the Soviet Union is continuing," stresses U.S. Director of Central Intelligence W. Webster. "It should assume more acute forms, without compromises and without lessening of effort. The USSR has been and remains enemy number one, our principal adversary, and blackmail, sabotage, and interference in its internal affairs should be additionally developed."

This is the "guideline" received by reactionary, extreme anti-Soviet elements in the West. They are counting heavily in their subversive activities on enlivened manifestations of nationalism in the USSR. Toward this end they are spreading provocationally fanciful conjectures aimed at shaking the unity of our multiethnic state.

Attempts to organize nationalist demonstrations in the Baltic serve as an example of anti-Soviet activities on the part of the Western intelligence services. In Vilnius, the capital of Lithuania, a group of extremists, egged on by Western "radio voices," was planning to organize an anti-Soviet demonstration for the purpose of smearing the decision adopted by the Lithuanian people in 1940 to reestablish Soviet rule in the republic and to join the USSR. Nevertheless, in spite of instructions broadcast repeatedly by foreign radio broadcasting organizations, announcing the time and place of the rally, only 250-300 persons gathered by the memorial honoring the poet Adam Mickiewicz.

And what problems were they addressing? What was concerning them? Some members of the assembled group attempted in their speeches to rehabilitate local collaborationist war criminals who had cooperated with the Hitlerite occupation authorities and who took part in annihilating 700,000 residents of Lithuania. Among these war criminals was a certain A. Klimaytis, who had taken part in wiping out the Jewish population in Kaunas. His son, a professional provocateur living in the West and ranking official of the so-called European Office of the World Federation of People of the Baltic, was one of the instigators of the subversive demonstration in Vilnius.

That very same day in Riga, the capital of Latvia, a group of people gathered by a monument on which are inscribed the words "To the Homeland and Freedom," plain words which are dear to the heart of everyone, and attempted, instigated by Western "radio voices," to smear these sacred concepts and to distort the historical truth.

Just who was gathered there at the monument, pouring a flood of lies into the microphone? The Voice of America reported that the organizer of the gathering was the so-called Helsinki-86 group. One of its members is L. Grantinsh, who has served time for evasion of the honorable duty and sacred obligation of service in the ranks of the USSR Armed Forces, a person literally seething with hostility toward our system and the Soviet Constitution.

A mass gathering in the Estonian capital is also on the conscience of Voice of America and the subversive broadcast organizations Radio Liberty and Radio Free Europe, if such a term can be applied to these organizations, as well as to a small group of individuals who in the past have been tried for anti-Soviet activities. This propaganda spectacle in Tallinn, played out according to the scenario provided by these anti-Soviet elements, also attempted to bring into question the legitimacy of Soviet Government decisions in 1939-1940. Once again there were falsifications.

Acts of provocation are the principal specialty of the Western "voices." They played their unsavory role in Hungary in 1956, in Czechoslovakia in 1968, and in

Poland in 1981-1982. The Soviet Union is constantly the target of the CIA. U.S. officials play the role of orchestra leader. For example, at a joint session of Congress the U.S. Senate and House of Representatives voted to declare 14 June 1988 Baltic Freedom Day. The idea was to acknowledge the alleged aspiration of the peoples of Lithuania, Latvia, and Estonia for "freedom and independence from domination by the Soviet Union," and they further pledged "to make use of every opportunity to support the rights of the Baltic peoples." High-handedly interfering in the internal affairs of the USSR, these self-proclaimed champions of "Baltic freedom" seek to preach to the peoples of Lithuania, Latvia, and Estonia and are even threatening to raise this question before the UN. It is reasonable to ask: who authorized these U.S. legislators to come out and declare what the peoples of these republics want and do not want and whither they are striving?

The same can be said about the man in the White House. During his visit to Moscow in May-June of this year President R. Reagan attempted to preach democracy to the Soviet people and to our youth. We do not need this: we know perfectly well what we should do in our own country and how we should do it. Would he not do better to bring order to his own house and, for example, to turn over to Soviet justice Nazi criminals and terrorists who were operating on the territory of the Soviet Baltic during World War II and who have found asylum in the United States? As we know, following numerous delays and much red tape, the only one of these to be deported to the USSR was K. Linna, who during the Fascist occupation served as a concentration camp commandant in the Estonian city of Tartu. B. Maykovskis, notorious for brutal reprisals against the civilian population of Latvia, Yu. Kungis, who commanded a punitive detachment in Lithuania, as well as many others continue to live unmolested in the United States.

And how are U.S. authorities responding to the Soviet Union's demand that they hand over the father-and-son skyjackers Brazinskis, who took refuge in the United States? More than 17 years have passed since they committed this crime. But the bandits have not yet received their just punishment.

This is how things actually stand regarding observance of human rights in the camp of the "fighters" for a "free Baltic."

There have been attempts on the part of the Western intelligence services to influence the situation in Nagorny Karabakh. The events in question certainly have local roots, consisting in some mistakes made in the conduct of nationalities policy. Our ill-wishers, however, have sought to exploit these difficulties. Western newspapers were filled with "sensational facts" of doubtful authenticity. Foreign radio broadcast organizations also took a sharp veer in the direction of whipping up passions around Nagorny Karabakh. Voice of America, for example, virtually came right out and instructed the

Armenian population to demonstrate. At the same time the BBC, patently inflaming nationalistic, extremist moods, broadcast an interview with an unnamed Azerbaijani who allegedly stated that "if the Karabakh is handed over to Armenia, it means war. And the Turks and our brothers in Iran will support us."

A number of major periodicals in the West have recently joined the wave of anti-Sovietism, including the U.S. magazines NEWSWEEK, TIME, and others. But the French magazine EXPRESS established a record for insinuations, one might say. It presented the situation in Armenia to its readers like a report from a theater of war. The West German magazine DER SPIEGEL has also proven to be unscrupulous, offering its pages to members of "the most active dissident groups in Moscow" as a forum to discuss the events in and around the Nagorny Karabakh.

As is evident from the examples we have cited, the actions of the Western intelligence services, radio broadcasting organizations, and anti-Soviet periodicals follow a common thrust—deliberate distortion of reality, whipping up fear, and arousing ethnic hostility. And, the most important thing: fearing increased influence of socialism in the world, an attempt is being made to hinder the policy of perestroika and democratic renewal of society which has been adopted by the CPSU and the Soviet people.

The means and methods employed by imperialist propaganda are dangerous, although without prospect of success. Today, in a period of glasnost, we are informed about the events which have taken place in the Transcaucasus this year, about their causes, and about those steps which must be taken to resolve accumulated problems. A CPSU Central Committee and USSR Council of Ministers decree has been issued on all these matters, which is also of great significance for the internationalist indoctrination of Soviet Armed Forces personnel.

Successful resolution of the nationalities question enables the world's first socialist state to form ethnically-mixed military units and subunits. Friendship among peoples and socialist internationalism are an important principle in Armed Forces manpower acquisition. Soldiers of 60-80 different nationalities are serving in military districts, 40-50 nationalities in combined units, 20-30 in units, including the Air Forces, and 7-16 in subunits. As was noted at the January (1987) CPSU Central Committee Plenum, the entire atmosphere of our life and joint labor, the family and the school, the military, culture, literature and art are called upon to form and instill the most noble sentiments—feelings of internationalism and Soviet patriotism—in Soviet citizens of all nationalities, and particularly in young people.

During the Great Patriotic War members of 62 nations and ethnic groups residing in the USSR were awarded the title Hero of the Soviet Union. Pilots awarded the

title Hero of the Soviet Union for courage and heroism displayed while carrying out their internationalist duty in the Republic of Afghanistan include members of the Russian, Ukrainian, Tatar, Moldavian, and Kalmyk peoples. Tens and hundreds of military aviator-internationalists of various nationalities have been awarded high government decorations and enjoy deserved prestige and respect.

Actions by antisocialist elements in the area of ethnic relations are an attempt to sow seeds of uncertainty and skepticism about the possibility of achieving the goals stated by our party. Fearing the "rebirth of the attractive force of socialist ideas and increase in the prestige of socialism as a society of working people," rightist elements seek to undermine the foundations of friendship and unity of Soviet peoples and to halt the forward movement of socialism. "In our ideological work and propaganda," notes Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, "we must be aware of all this and take appropriate measures."

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AF Regiment's Progress in Improving Pilot Discipline Reported

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[Article, published under the heading "Great Vigilance, Constant Combat Readiness," by Military Pilot 1st Class Gds Lt Col V. Popov: "Orderly Procedure—Law Governing Flight Activities"]

[Text] The terms "combat readiness" and "discipline" are closely interlinked. A high degree of combat readiness is simply inconceivable without firm military discipline.

Of particular importance is flight operations discipline, the state of which determines in large measure quality and safety of performance of combat training missions in the air.

The situation is quite good in the squadron commanded by Gds Lt Col V. Gelmich. This is a close-knit, cohesive unit in which a businesslike atmosphere prevails, fostering accelerated improvement in the combat skills of aircrews and aircraft maintenance groups. The training and indoctrination process is intensifying here in the course of the second phase of perestroika, and the training and proficiency of each pilot and performance of assigned tasks are being rigorously monitored. If there occur any deviations from guideline documents, immediate steps are taken to correct them and to prevent similar mistakes on the part of other Air Forces personnel.

A persistent campaign is in progress, not only in the squadron but in the regiment as a whole as well, to strengthen flight operations discipline and to ensure

unswerving observance of the rules and procedures governing flight activities. Experience confirms that a mistake by a pilot, engineer, or technician, especially if he is young and inexperienced, is most frequently a result of failure to observe these rules and procedures and the requirements of regulations and operating manuals.

...The following incident occurred during scheduled flight operations. Everything was proceeding normally, when suddenly Gds Sr Lt I. Sysoy, who had decided to put his ability to the test, altered the prescribed flight configuration, committing a most serious disciplinary infraction. The mishap-threatening situation was corrected with prompt measures, but the causes and potential consequences were the subject of a special discussion at the subsequent training sortie critique and analysis session. The pilot was punished, and the question of grounding him was even raised.

Were they too severe with this violator of flight rules and regulations? Not at all.

Disregard for discipline requirements is intolerable in aviation. We therefore endeavor to organize things in such a manner that each pilot bears personal responsibility for the quality of performance of combat training missions and for flight safety.

Analysis indicates that the principal reasons for flight discipline infractions are complacency, lack of knowledge and skills, and a diminished feeling of responsibility for the assigned task. We endeavor to combat these deficiencies to the extent of our resources and capabilities. Gds Maj A. Arestov, A. Shishkin, our other commanders and political workers, staff officers and party committee members do not ignore a single mistake in the air. Measures to prevent the recurrence of a mistake are taken immediately. A detailed discussion is held during the general critique and analysis of flight operations, in the course of scheduled training activities.

Just prior to every training activity or practice session Gds Maj A. Shishkin and the other squadron and flight commanders thoroughly quiz the men to verify that they are prepared and ready to perform the training activity at hand. Not only a pilot's professional competence is tested, but also his preparedness to respond to an in-flight emergency situation. The commanders focus the combat pilots on performing their duties in an exemplary manner and eliminating the slightest elements of carelessness, unconcern and lack of discipline.

Military Pilot 1st Class Gds Maj I. Kirsanov did a fine job at a tactical air exercise conducted in conditions maximally approximating actual combat. When a performance-grading intercept target, being flown by a military pilot-expert marksman, suddenly and abruptly changed its altitude and heading, Kirsanov did not become flustered, skillfully attacked it in the immediate proximity of the ground, and "shot it down" with his first burst.

At that same tactical air exercise Military Pilots 1st Class Gds Capts A. Gornov, V. Yevdokimov, and others displayed examples of initiative, bold and resolute actions. At the same time they unwaveringly observed the requirements of flight operations discipline.

I am personally convinced that flight operations, organization and orderly procedure are predetermined by thorough knowledge by each pilot of his task and the modes of accomplishing it. How do we accomplish this? First of all the squadron commander, his deputies, the executive officer and the subunit's party organization secretary explain the specific features of the flight operations shift and focus the men's attention on the most difficult and critical phases. Thorough knowledge of combat training and optimal ways to accomplish them constitute that fundamental principle without consideration of which neither the flight commander, the pilot, nor the flight operations officer and command post team will be able to substantiate the demands imposed on selection of a correct decision, will be able to accomplish target search and lock-on within the prescribed time limits, and then subsequently destroy the target.

The experience of our vanguard pilots indicates that their successes are due in large measure to unswerving observance of prescribed procedures and regulations, orders and instructions by command personnel on the ground and in the air. It is precisely thoroughly-understood actions, discipline, and flawless efficiency and follow-through which enable military pilots 1st class Gds Lt Col V. Yashkin, Gds Maj B. Grigoryev and other pilots skillfully to operate modern aircraft and aircraft weapons and to perform difficult air combat training missions confidently and efficiently. These combat pilots are also capable methods specialists. They thoroughly analyze pilots' performance in the air and objectively evaluate the maneuvers they perform.

According to the procedure adopted in the regiment, a pilot is not permitted to go out again until his superior examines the tapes of his preceding training sortie. Performance monitoring team personnel prepare these materials. And appropriate decisions are made immediately, without delay. Our commanders and political workers, using not only word and wise advice but practical demonstration as well, teach the men the ability to perform flight assignments in a complex air and weather environment and teach them efficiency, follow-through, discipline, and a party attitude toward the assigned task.

We achieve strict observance of the requirements of discipline and organizations on the ground and in the air by means of constant demandingness on the part of commanders and an uncompromising attitude even toward the slightest violations of orderly procedure, rules and regulations governing flight operations. In this regiment considerable importance is also attached to personal example by the pilot and flight commander in observing the requirements of the Manual of Flight

Operations, the aircraft operating manual, and the flight operations schedule, as well as to an exacting attitude toward quality of flying technique, combat flying and weapons delivery.

Of course we consider it entirely legitimate that, in requiring from subordinates precise observance of the provisions of guideline documents and flawless execution of orders and instructions, leader-Communists themselves must serve as an exemplary model to those whom they are teaching and indoctrinating. This is the fundamental basis of their authority, which they must not only earn but highly value as well. One should constantly bear in mind the guideline statement articulated at the 27th CPSU Congress to the effect that the ideological-ethical qualities of political workers, their practical activities, and the ability actively to implement the party's policy should constitute determining criteria in all cadre reassignments. Every leader should be distinguished by ideological staunchness, high standards of political knowledgeability, competence, the ability to organize collective activity, dedication to principles, solid moral convictions, and a constant and continuous need to communicate with the masses and to be deeply committed to people's interests and needs.

In most of our subunits an effective campaign is being waged against deficiencies in training and discipline and against complacency. Commanders and political workers develop businesslike efficiency, firmness and integrity in aviation personnel and work tirelessly to increase each man's feeling of responsibility for performance of his job-related duties and military duty. A solid barrier has been erected against violations of the rules and regulations governing flight operations in our unit. This is a result of demandingness on the part of our commanders and of specific, purposeful party-political work.

We constantly concern ourselves with the men's ideological conditioning. The daily work done by our commanders, political workers, party and Komsomol organizations fosters the development of skilled, disciplined combat pilots who are dedicated to the cause of CPSU and the Soviet homeland. Their efforts are directed primarily toward forming ideological conviction, efficiency, follow-through, and discipline in our men.

Squadron deputy commander for political affairs Gds Maj V. Gryzlov does an effective job of organizing the effort to strengthen discipline. Himself an expert at combat maneuvering and fire delivery, an officer with follow-through and initiative, he also develops these qualities in his men.

Recently, following a regular combined inspection of the state of discipline in the subunit, party member Gryzlov suggested that the results be discussed not in a narrow forum but at an open party meeting, that all discovered shortcomings be presented from the standpoint of glasnost for judgment by the body of party members and that they deliberate how to proceed in the future. A lively,

serious, frank conversation ensued. Party members made to-the-point suggestions on strengthening party influence on aviation personnel, on improving the placement and training of party-Komsomol activists, and on increasing the effectiveness of indoctrinating military personnel with famed battlefield examples of discipline and strict observance of the demands of the law, military regulations, and the military oath of allegiance. These suggestions, as well as party members responsible for their implementation, were voted approval by those present. Thus one of the most important means of improving discipline and organization—collective party opinion—was put into operation. Each and every party member felt a personal responsibility for affairs in the squadron.

Today a change for the better is already evident in the subunit. Recently we have succeeded in preventing and correcting many instances of gross disciplinary infractions. The training process is continuing to be improved. Party members are seeking to ensure that the very atmosphere and environment during flight operations and training activities as well as the entire course of training teach discipline to aviation personnel.

After pilots have completed a training assignment, the squadron party organization secretary, the flight commander and party group organizer always speak to them, in addition to the subunit commander and political worker. They ascertain the specific features of the training flight, inquire about how the aircraft performed in the air, about any difficulties the aviators encountered, and how they responded in various situations. They immediately give practical advice for the future.

Detailed study of know-how and experience and analysis of mistakes make it possible to take note of all valuable items and to warn about possible errors in a prompt and timely manner. And this is very important. Aircraft have become much more complex today, and it is becoming increasingly more difficult to service, maintain, fly, and fight today's aircraft. And yet this is not always taken into consideration when organizing party-political work on days of preliminary preparation for flight operations or during flight operations. In the course of perestroika methods of publicizing advanced know-how unfortunately at times remain unchanged. Activists will put out a printed newflash on outstanding performers, the name of a violator of flight operations rules and regulations will be announced at a meeting, and that will be the extent of it. And yet it would be a good thing to relate in greater detail how an individual achieved success or what caused an individual to commit a breach of regulations.

We should note that in our best squadrons advanced know-how is publicized promptly and efficiently. If a pilot has flown an excellent training sortie or a crew chief and mechanic have preflight-serviced an aircraft in an exemplary manner, all personnel are promptly informed

of this. News bulletin leaflets, publicity news sheets with photographs, and wall-posted newspaper-type publicity materials are extensively used for this purpose.

A talk on the subject "Strengthening Discipline and Organization During Flight Operations Is a Matter of National Importance" was recently held in the squadrons. In the course of this discussion officers, analyzing achievements and shortcomings in the training and indoctrination process, presented suggestions on eliminating the causative factors of lack of discipline and air mishap-threatening situations.

Each month the regimental party committee conducts various activities with the pilots, at which they explain the need to have extreme composure in the air and strictly to observe the requirements of regulations and guideline documents. Topics of talks held recently in the squadrons by members of the regimental party committee include "Discipline and military aviator combat readiness," "The pilot's responsibility for observing discipline in the air," and "The rules and regulations governing flight operations must be obeyed to the letter."

Recently a meeting was held in our headquarters party organization with the agenda "Personal example by leader-Communists in strict observance of flight regulations and procedures and in ensuring flight safety." The regimental commander presented a report. He analyzed at length the work performance of party members, discussed in detail their personal exemplariness in observing the requirements of regulations and other guideline documents, and revealed shortcomings which negatively affect speeding up intensification of the training and indoctrination process in the course of perestroika.

The main thing in the statements made by party members was the idea that combat readiness and the flying proficiency of flight personnel can be improved only if all party members wage a resolute campaign to improve efficiency, follow-through, and discipline, and for rigorous observance of flight regulations and procedures. And it is not mere happenstance that some party members were brought severely to account for errors of omission in their assigned areas. The party meeting appreciably helped increase the responsibility of the pilots for observing the requirements of flight operations discipline and for efficient performance during flight operations shifts. Party members were made to understand why a resolute abandonment of obsolete views and a superficial approach to flight activities is necessary.

Today self-analysis and self-criticism by leader-Communists and their contributions toward strengthening organization of training and flight operations discipline should have a more clear-cut point of departure. In my opinion it is the following: how we are performing our job-related and party duties from the standpoint of the demands of the 27th CPSU Congress and 19th All-Union Party Conference? Everything that is not based

on this foundation is idle talk, merely an appearance of meaningful action, an attempt not to hasten perestroika but to continue on essentially changing nothing.

But perestroika applies first and foremost to the work methods of leader-Communists and all party members pertaining to carrying out the demands of the CPSU Central Committee on strengthening military discipline, the foundation of which consists of ideological conviction, intellectual maturity, initiative and innovativeness on the part of the collective. This restructuring requires of each and every one of us genuinely businesslike efficiency and innovation, rigorously and firmly grounded on regulations, with profound dialectical comprehension, skilled, prompt, timely practical application of their points and provisions.

As we develop discipline in personnel, we make every effort to develop in them a correct understanding of the essence of discipline and its ever-growing role in accomplishing the tasks of combat training, and we emphasize that slipshodness, complacency, carelessness and unconcern constitute serious preconditions for air mishaps, which cannot be tolerated.

We are approaching the end of the training year, the year of the 19th All-Union Party Conference, which assigned large and critical tasks to the Soviet people and the men of the USSR Armed Forces. For the aviator-guardsmen of our regiment it has constituted a new milestone in our combat and political development and in further increasing the effectiveness of competition, organization and discipline of flight operations. Noting outstanding performers according to their merits, we are promptly and efficiently adopting their experience and know-how in a practical manner. Toward this end we plan to hold methods conferences with training instructors and improve our training facilities. We are concerning ourselves with the quality of future flight operations and with conducting them in a highly-organized fashion, on the basis of a high degree of discipline, without mishaps or mishap-threatening situations.

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Soviet Orbital Observatory Described

91440095m Moscow AVIATSIYA I KOSMONAVTIKA
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[Article, published under the heading "The Space Program Serving Science and the Economy," by Yu. Zaytsev: "Out There Beyond the Clouds"; part two of two-part article (for part one, see No 8, 1988)]

[Text] Soviet, French, and Bulgarian scientists are jointly designing an orbital observatory, named Granat [Garnet]. It will carry instrumentation to conduct detailed investigation across a very broad range of energies: from 3 to 2,000 keV. This instrumentation will provide capability to determine plasma temperature in

clusters of galaxies, X-ray pulsars, accretion disks around black holes, and to detect objects with a nonthermal radiation mechanism. We should note that the U.S. Einstein satellite observatory, which provided scientists with large quantities of new information, frequently of a quite unanticipated nature, operated only in a soft-radiation energy band from 0.1 to 3 keV.

The orbital parameters of the Granat space observatory and the large mass storage capacity of the onboard digital computer will provide capability to conduct around-the-clock observations. This observatory will carry instrumentation of greater sensitivity and handle a broader range of scientific tasks than all past space projects and all other projects currently under development.

A West German Rosat satellite, tasked primarily with mapping the celestial sphere in the soft X-ray band, is scheduled to be launched simultaneously with the Granat. The high source localization accuracy of the Granat's instrumentation will make it possible to identify sources with sources on maps obtained by the Rosat satellite and other means. This will provide capability to examine the spectra of weak sources across the entire electromagnetic spectrum—from radio waves to gamma rays.

The Granat will also be the world's largest unit designed specifically to observe gamma bursts. Mounting the equipment on a swiveling platform will make it possible to aim at an emission source within seconds and obtain time-line spectra of that source. Utilization of detectors with narrow fields of view and mutually displaced optical axes will provide for accurate (down to minutes of angle) localization of gamma burst sources.

The Spektr-Rentgen-Gamma project will help accomplish a significant step forward in understanding the nature and physical properties of various classes of astrophysical objects.

It is projected that a satellite carrying two large X-ray telescopes with oblique-incidence optics—special cones made of nickel-coated aluminum foil—will be launched at the end of 1992 into an elliptical orbit with a four-day orbital period (200,000 km apogee). Its cone-cone optics can provide an angular resolution in the range of 2 minutes of angle in a 1-degree field of view. Soviet scientists are working on the development of these telescopes jointly with the Danish Space Research Institute.

The telescopes are to be launched into space in a folded configuration, and will deploy once they are in orbit. With these telescopes it will be possible to observe highly-ionized iron ions (hydrogenlike and heliumlike) in the spectra of hot intergalactic gas in clusters of galaxies.

Two other telescopes, much smaller but with a higher resolution (10-30 seconds of arc), are to be utilized to investigate cosmological problems within the Spektr-Rentgen-Gamma project. They are being developed jointly with scientists from the FRG, Italy, Great Britain, and the European Space Agency.

Multilayer normal-incidence mirrors can be used in the extreme ultraviolet—one of the last areas of astronomy which has not been investigated in detail. It is likely that the observatory will also include telescopes with such mirrors. It is planned to mount some of these on the swiveling platform together with a small oblique-incidence telescope (USSR, GDR, Czechoslovakia) and an X-ray telescope with coded aperture and optical monitor (Bulgarian People's Republic). This set of instruments will provide capability to conduct detailed investigations of comparatively bright sources which suddenly appear in the heavens.

An extremely broad range of measurements, from 0.02 to 100 keV, high spectral resolution, capability to produce images across the entire range of energies, and high sensitivity will make the Spektr-Rentgen-Gamma observatory unique in comparison with any scientific project ever carried out abroad or scheduled for coming years.

The inclusion of the gamma radiation frequencies within the range of astronomical observations should lead to a qualitative leap forward in man's knowledge of the world around him. Gamma-ray quanta are produced by the interaction of high-energy particles with matter, such as in thermonuclear reactions. Such processes apparently form the basis of the "vital activities" of stars and galactic nuclei and take place during novas and during explosions of galactic nuclei. Thus gamma astronomy provides the opportunity to look into the world of high energies and to study the processes which control the world of the stars and galaxies and which ultimately determine the evolution of the universe.

Another notable characteristic of gamma radiation is its high penetrating capability. It is not affected by electromagnetic fields and propagates virtually rectilinearly. Absorption in all directions does not exceed one tenth of one percent on the average. The metagalaxy is essentially transparent to such radiation. Absorption of gamma quanta becomes appreciable only for very remote parts of the universe, where the average density of matter is appreciably greater. Consequently gamma astronomy has the potential to "look" further even than radio astronomy and to "see" earlier eras in the development of the universe.

Such special regions of the galaxy as its center, which is obscured by clouds of dust and gas surrounding the galactic nucleus, which is not visible at optical wavelengths, should also be "visible" at gamma ray wavelengths.

Soviet, French, and Polish scientists are presently completing preparations to launch the world's largest orbital gamma observatory. In addition to the large main telescope, Gamma-1, two additional astronomical instruments will be carried on board—an X-ray telescope and a soft gamma radiation telescope. All telescopes will be aimed at strictly prescribed regions of the night sky with a high degree of accuracy.

One of the main advantages of the Gamma-1 telescope is its high angular resolution and sensitivity. They are provided with unique wide-gap spark chambers and a special encoding "screen." These unique devices will make it possible to observe an entire area of the celestial sphere large enough to contain the scoop of the Big Dipper. The duration of observation of a single sky region will range from one week to one month.

Soviet space program plans also include establishment of an earth-space radio system which will be equivalent in effectiveness to a gigantic radio telescope with an antenna more than 1 million kilometers in diameter. This radio system—called an interferometer—will consist of synchronously-operating space antennas launched into various orbits, as well as large ground-based telescopes. The greater the distance between antennas, the higher the angular resolution of this synthetic mirror, that is, its capability to differentiate at enormous distances radio wave emitting objects located in close proximity to one another.

This project, called Radioastron, is to be carried out in three phases, between 1991 and 2001. The first phase calls for launching into highly elongated orbits two space radio telescopes with antennas 10 meters in diameter, forming a single system with a ground-based network of radio interferometers. The orbital period of the first instrument will be 24 hours, and the second—27 hours. In the second phase an additional 10-meter radio telescope will be launched into an orbit with an apogee of 80,000 km. Finally, the third phase calls for establishment of a space system of three radio telescopes each with an antenna diameter of 30 meters. One will be in a geosynchronous orbit, the second will be in an elliptical orbit with an orbital period of 27 days, and the third will be positioned at the antisolar libration point (approximately one and a half million kilometers distant from Earth).

According to calculations, the resolution of an earth-space telescope pair will be hundred thousandths of a second of arc. This is thousands of times greater than the world's largest ground-based optical telescope, which is located in the North Caucasus and has a mirror diameter of 6 meters.

The long-range space communications system 70 meter antennas at Yevpatoriya and Ussuriysk will serve as the ground-based arm of the Radioastron project radio interferometer. One other radio telescope, with a 70 meter parabolic antenna, is being built in Uzbekistan, on the

Suffa Plateau near Samarkand. A special operations center of the USSR Academy of Sciences Institute for Space Research is being built at this site.

A special vehicle weighing approximately 5 tons is being developed to transport the space radio telescopes into orbit. Scientific equipment, including a 700 kilogram telescope antenna fabricated of carbon-reinforced plastic, will contribute one and a half tons of the total weight.

The "brain center" of the Radioastron project is located in the Soviet Union, but the problem itself is increasingly taking on an international character. Scientists in Western Europe, the United States, and Japan are working on this project. It is possible that a future synthetic radio telescope antenna will include the space radio systems of many countries.

We have outlined above some of the accomplishments and future prospects of Soviet space-based astronomy.

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Mars-Phobos Mission Described

91440095n Moscow AVIATSIYA I KOSMONAVTIKA
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5 Aug 88) pp 46-47

[Article, published under the heading "Space Flight Support," by Doctor of Technical Sciences Professor N. Ivanov: "Mission to Phobos"]

[Text] The historic flights of the Soviet Vega unmanned interplanetary probes to Halley's Comet are still fresh in our memories, and publication of the obtained scientific data is still in full swing, while scientists from many countries, led by their colleagues from the Soviet Union, are taking part in a new mission to Mars and its moon Phobos.

Soviet and U.S. unmanned interplanetary probes have already flown to Mars and landed on the Martian surface. They have enabled us to obtain a great deal of additional information about this planet and its moons and to advance forward in finding the answers to a number of questions. At the same time important, complex new problems were advanced in the course of these missions, which are of great interest not only to scientists but to all mankind as well.

This journal has informed its readers about forthcoming Phobos mission experiments and investigations (AVIATSIYA I KOSMONAVTIKA, No 9, 11, 12, 1986). The purpose of this article is to discuss the specific features of this mission and the principal problems facing interplanetary ballisticians, without whose reliable and coordinated efforts it is impossible to guide the space vehicles accurately to the target, to tie all conducted experiments into a time and space frame, and to conduct a number of investigations in the area of celestial mechanics.

As we know, Earth and its moon travel around the sun in a close to circular orbit, in a plane called the plane of the ecliptic. The Martian orbital plane is inclined at an angle of 1.8 degrees to the plane of the ecliptic. The two Martian moons—Phobos and Deimos—travel around Mars in close to circular orbits, with a radius of 9,350 and 23,500 km and at a velocity of 2.14 km/s and 1.35 km/s respectively. These moons are of irregular shape. The maximum dimension of Phobos is 27 km, and that of Deimos is 15 km. They travel practically in the plane of the Martian equator, which in turn is inclined by 24 degrees to the plane of the ecliptic.

As we know, there exists an optimal mutual positioning of the planets of origin and destination, at which energy expenditures will be minimum. Favorable situations occur once every 26 months for a Mars mission. At this time it approaches Earth to a distance of about 90 million kilometers. Opposition at or near closest approach to the sun occurs every 15-17 years, when Mars approaches to a distance of 56 million kilometers from Earth. Such an opposition will take place this September. One should stress, however, that these essential astronomical conditions are not sufficient, since they fail to take into consideration all the restrictions imposed by the Phobos project. What is the optimal mission configuration?

Precisely this question was posed to the designers and ballisticians when the Phobos mission was being planned and refined. Now one can state that a highly interesting and unique scheme has been found and comprehensively elaborated. It provides for optimal solution of problems during all phases of the mission, including such traditional phases for all interplanetary missions as departure from Earth and passage between the two planets.

The time for the Mars launches, when energy-favorable flight trajectories could be utilized, was selected for July 1988. In this month the inclination of the plane of the interplanetary vehicle flight trajectories to the plane of the equator would be 24-28 degrees. Such flight paths, with direct boost from the surface of the Earth, can be achieved from locations lying within a zone of 25 degrees north and south of the equator. The southernmost point in the USSR (the town of Kushka) is situated at 35 degrees north latitude, and consequently it is virtually impossible to launch a vehicle toward Mars from Soviet soil. But there is a solution. Initially the probe vehicle, with an orbital escape booster unit, is launched into an intermediate earth orbit, at a calculated point during which the escape booster is ignited. This booster accelerates the probe vehicle to hyperbolic velocity relative to the Earth, allowing the vehicle to escape our planet's gravity.

Such a launch configuration is traditional for Soviet interplanetary vehicles. But on this occasion the configuration contained one fundamental difference. The escape booster unit, instead of accelerating the vehicle by 3,800-3,900 m/s, provided an acceleration of only 3,400

m/s and then separated. The probe provides final acceleration with its own propulsion system. This arrangement made it possible to increase the payload launched toward Mars.

During the Earth-adjacent portion of the mission, telemetry will be used to check the correctness of the flight path. The fact is that even very small errors in velocity lead to missing the destination planet by a wide margin. For example, a velocity error of only 1 meter per second can result in a miss amounting to tens of thousands of kilometers. And if errors are not promptly corrected during the initial phase of the mission, required fuel consumption will increase sharply as the vehicle moves further from Earth, reaching a magnitude at which flight path correction becomes impossible.

The flight to Mars will take almost 200 days. And during this entire time the ballisticians, together with the other mission control services, will be tracking the vehicle at every step, correcting errors which arise with appropriate adjustments.

Although the ballisticians' job is difficult and complicated during the initial phase, the tensest and most critical phase is the approach to Mars and subsequent placement of the vehicle into the required orbit. As we know, one of the principal tasks of the Mars mission is combined investigation of the Martian moon Phobos, including placing a special extended-operation self-contained lander vehicle onto the Phobian surface. To accomplish this, the probe vehicle must first be placed into an orbit around Mars which is close to the orbital path of Phobos.

Scheduling the mission at opposition at or near closest approach to the sun basically makes it possible to accomplish this task in a fairly simple manner. First the propulsion system fires up at a precise point in the vicinity of Mars, at the so-called aiming point, and the vehicle is transferred into an orbit close to that of Phobos. After this a short burn final-adjusts the probe's orbital plane to equal that of Phobos. These two simple maneuvers can be replaced by a single three-axis maneuver.

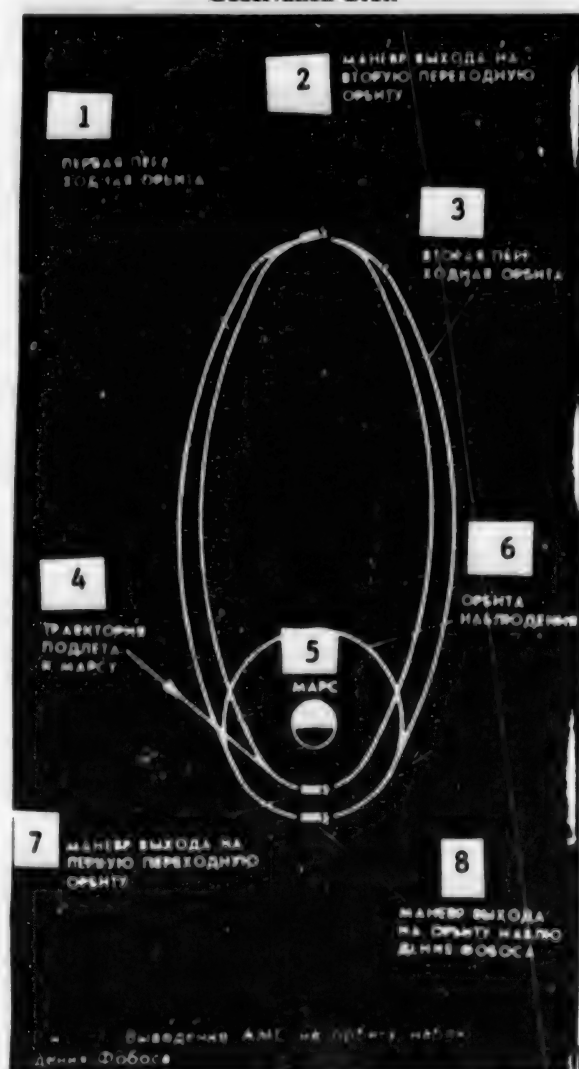
As calculations indicated, however, these maneuvers would require greater fuel consumption. Therefore the mission planners and ballisticians chose another configuration which is more economical in energy expenditure and provides an additional payload gain. There are always trade-offs, however. In this instance employment of the new configuration involves the need to perform additional dynamic operations with the probe vehicle, which naturally increases orbital-insertion time. This complicates operations both for the probe proper and mission control personnel, including the ballisticians.

Thus a flight path correction is made as the vehicle approaches Mars, in order to obtain the minimum possible orbital pericenter. As the vehicle passes the planet at closest approach, the retrorockets are fired up, and the

probe enters a first transfer orbit (Figure 1). This is an elongated elliptical orbit with a low pericenter—about 400 km above the Martian surface, with an apocenter greater than 76,000 km, with the orbital plane close to that of Phobos; the probe's orbital period is 3 days.

12-15 days after refining motion parameters, the probe vehicle is moved into the second transfer orbit. To accomplish this, an acceleration burn is initiated near

Figure 1. Inserting Probe Vehicle Into Phobos Observation Orbit



Key:

1. First transfer orbit
2. Insertion maneuver into second transfer orbit
3. Second transfer orbit
4. Mars Approach trajectory
5. Mars
6. Observation orbit
7. Insertion maneuver into first transfer orbit
8. Insertion maneuver into Phobos observation orbit

the apocenter, and the orbit pericenter is raised to an altitude of 6,300 km, which is approximately 300 km higher than the orbital path of Phobos. At least 10-12 more days will be required to maneuver the probe into a Phobos observation orbit—a circular orbit with a radius of 200-300 km greater than that of the orbit of Phobos. At this time the parameters of motion of Phobos and the probe will be determined in detail in order to accomplish subsequent approach.

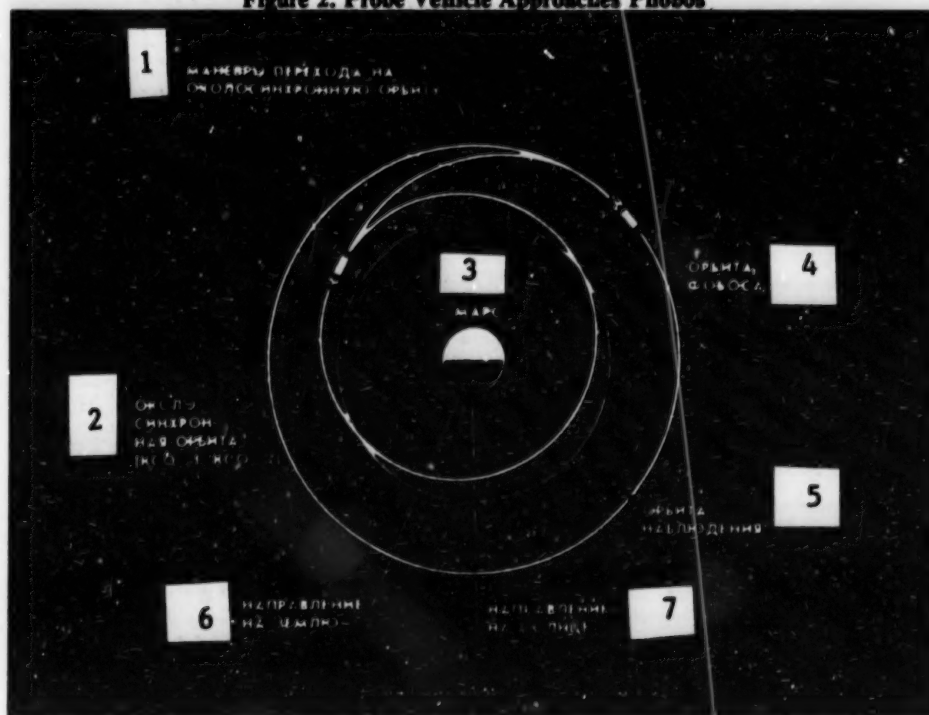
The parameters of the observation orbit are selected in such a manner as to ensure optimal conditions for accomplishing precisely this task. First of all, separate optical measurements are made from the probe, which make it possible to determine the angular position of Phobos relative to the probe. Most favorable conditions for these measurements recur every seven days. At the same time measurements of the probe's parameters of motion are performed from the Earth by radio telemetry, by interferometric measurements employing an international network of tracking stations, as well as by astrometric measurements of Phobos.

The main concern of the ballisticians during this phase of the mission is prompt refinement of the parameters of motion of the probe and Phobos from the aggregate of all

measurement data. This is an extremely complex multi-parameter problem. Solution will require several weeks. As information is collected and the figures on the orbital parameters of the probe vehicle and Phobos are refined, a maneuver will be performed to bring their planes into full alignment.

Even this considerable preparatory work does not make it possible simultaneously to accomplish a precise rendezvous between mission vehicle and Phobos and to drop a lander vehicle on the latter's surface. It is necessary to plot two additional intermediate orbits. First the vehicle will be brought with two maneuvers into a first quasisatellite orbit (KSO-1). This is a very interesting orbit (Figure 2), determined in the course of preparations for the mission. If an observer were standing on Phobos, he would see a satellite moving across the sky. In actual fact the probe vehicle is not a satellite of Phobos in the sense that we define an artificial satellite of the Earth or Moon. It is only an apparent satellite, a quasi-satellite. The probe remains a satellite of Mars, but its motion is selected and executed in such a manner that for an extended period of time it remains close to Phobos, as if flying around it, approaching as close as 200 km from its surface and moving away up to 600 km. This is accomplished as follows. Executing precisely computed maneuvers, the probe is inserted into a Mars

Figure 2. Probe Vehicle Approaches Phobos



Key:

1. Transfer maneuvers into a near-synchronous orbit
2. Near-synchronous orbit (KSO-1, KSO-2)
3. Mars
4. Phobos orbit

5. Observation orbit
6. Direction toward Earth
7. Direction toward Sun

orbit with a period not exceeding the orbital period of Phobos by more than 25-30 seconds. This exceptional magnitude of accuracy of calculations and maneuvers is required of the ballisticians and mission control people.

The most favorable conditions for observation of Phobos are created when the probe vehicle is traveling in KSO-1. The probe will remain several weeks in this orbit, and during this entire time the ballisticians, utilizing an aggregate of measurements taken by the probe and from Earth, will further refine the vehicle's orbital path in relation to that of Phobos.

A new maneuver will be executed in approximately 2-3 weeks, and the probe will move into a new orbit—KSO-2. The probe vehicle's new orbital period will differ from that of Phobos by only 15 seconds. Distance between them will not exceed 50-200 km. In order to grasp the unique nature of these maneuvers it suffices to note that a few seconds error in orbital period will make the probe's orbital path move away from Phobos. And yet all these operations are being performed at a distance of hundreds of millions of kilometers from Earth, with a radio signal taking more than 10 minutes to travel from the probe to our planet.

While the probe is traveling in this orbit, specialists will be studying Phobos with the aid of various devices, including TV, will select a Phobos probe landing site, and will compute the subsequent approach maneuver. The approach maneuver proper will be performed independently by the probe vehicle, utilizing various onboard radio devices. The probe vehicle will pass over the surface of the Martian moon at a distance of several dozen meters. The Phobos lander will separate from the probe vehicle and descend to the surface, while some time later the mother vehicle will move away from Phobos and continue orbiting Mars. Activities involving the Phobos lander vehicle will continue for several months. Foreign tracking stations will take part in these activities together with the Soviet tracking station. At the same time scientists will be conducting a broad range of scientific observations and experiments with the mother vehicle.

In conclusion we should note that the ballisticians' work is not limited to the above-described tasks and problems. They will conduct interesting basic experiments in celestial mechanics, including detailing and refinement of our knowledge of the orbital motion of Phobos, its motion around the common center of mass, determination of the gravitational fields of Mars and Phobos with greater accuracy, and more precise determination of the mass of the other Martian moon—Deimos—and several asteroids. Accomplishment of these tasks will help refine and detail basic theories and will help make future unique missions possible.

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Articles Not Translated From AVIATSIYA I KOSMONAVTIKA No 9, Sep 88

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